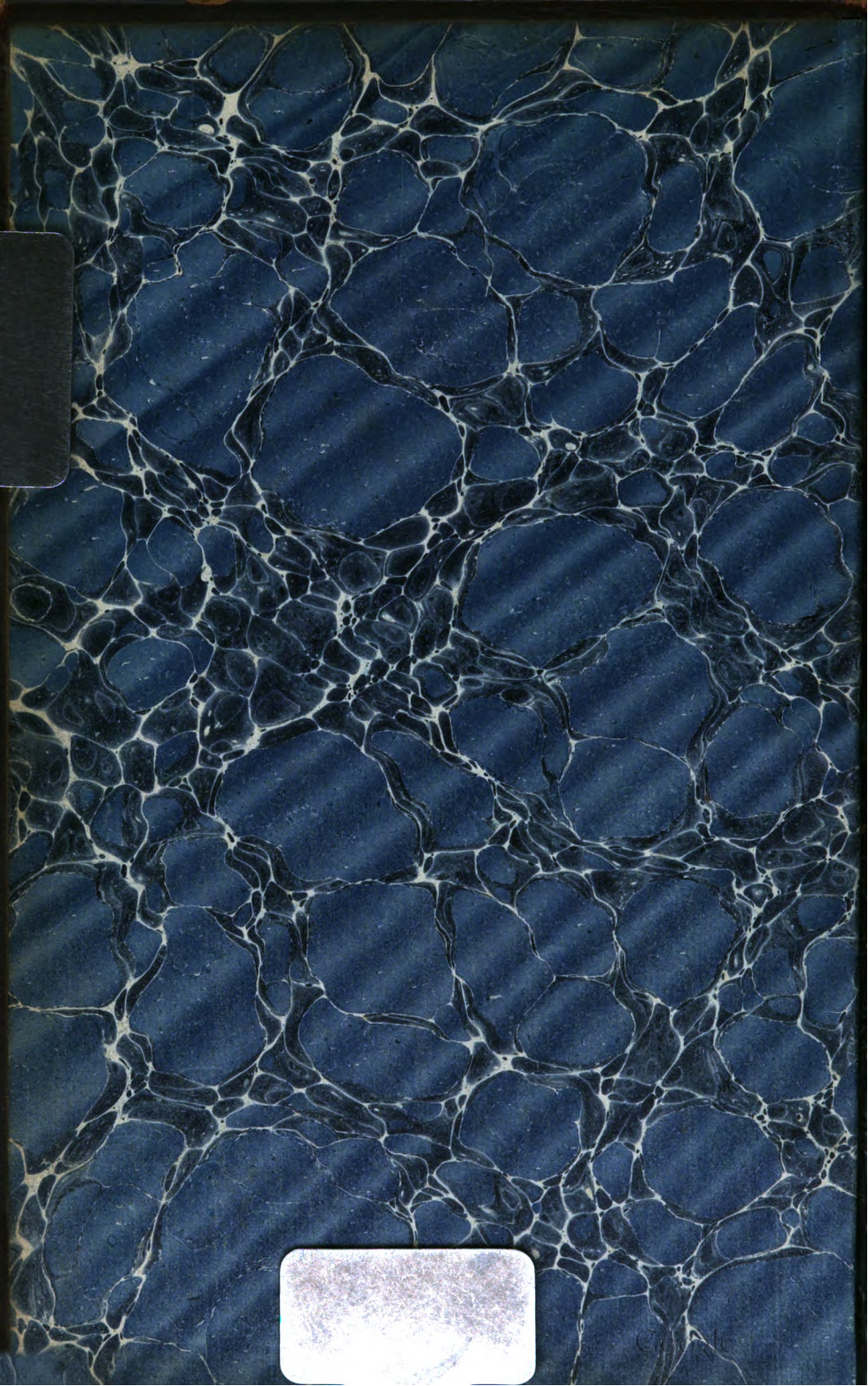
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MADRAS ARTILLERY RECORDS

VOLUME 12

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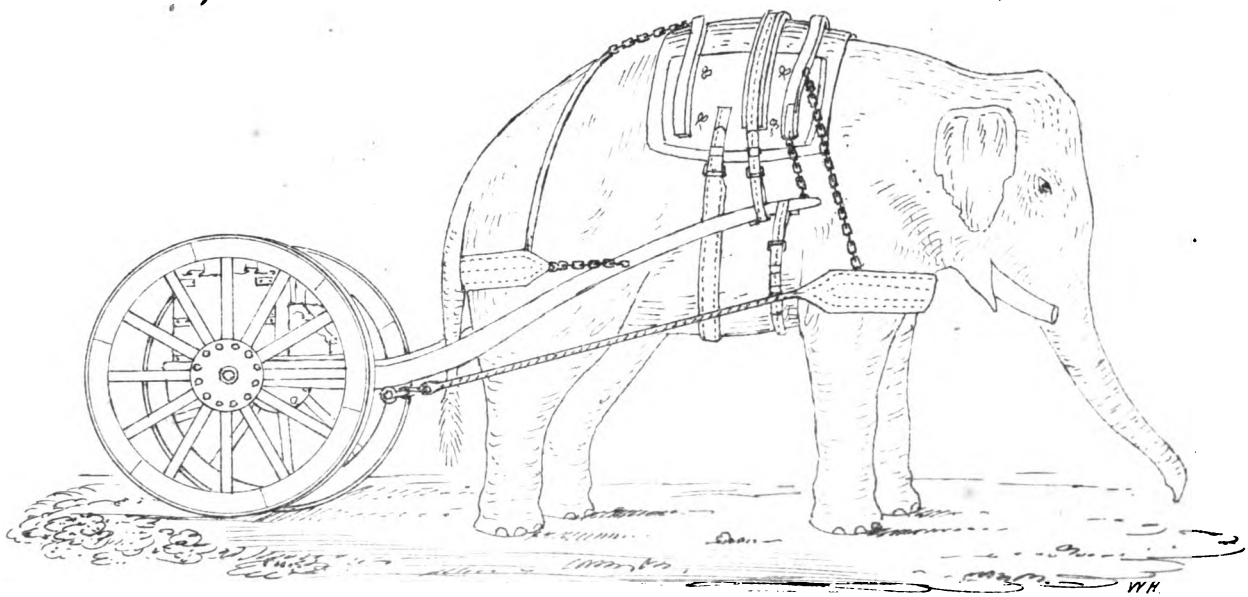
Plate 43

Artillery Select Committee

Meeting 114 Article 340

Elephant Harness

proposed alterations by Captain Simpson



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SELECT COMMITTEE PROCEEDINGS, 1850.

MEETING 159.

EXTRACT FROM THE PROCEEDINGS OF THE PERMANENT ARTILLERY SELECT COMMITTEE, ASSEMBLED BY ORDER OF COLONEL P. MONTGOMERIE, C. B., BRIGADIER COMMANDANT OF ARTILLERY.

Artillery Depôt, Saint Thomas' Mount, 28th February, 1850.

Present.

LIEUT. COL. F. F. WHINYATES, *Principal Commissary of Ordnance.*
LIEUT. COL. H. S. FOORD, *Commanding 4th Battalion Artillery.*
MAJOR P. J. BEGBIE, *Commanding 5th Battalion Artillery.*
MAJOR J. W. CROGGAN, *Commanding 2d Battalion Artillery.*
CAPTAIN J. MAITLAND, *Superintendent Gun Carriage Manufactory.*
CAPTAIN A. F. OAKES, *Director Artillery Depôt.*
CAPTAIN A. J. BEGBIE, *4th Battalion Artillery.*

ARTICLE 549.

MODE OF PACKING, STORE, AND ARTIFICERS' CARTS. PLATES 1 AND 2.

(a) Meeting 158, Article 546.* The carts (") recommended for adoption in lieu of Waggons, viz.:

A Store Cart,
An Artificers' Cart,

are packed with the allotment of Stores and half wroughts, &c., allowed to a Battery for the inspection of the Committee with a view of obtaining their opinion as to the mode of packing these Carts.

2. OPINION.—The Committee having inspected the different methods of packing the Store and Artificers' Carts, prefer that shown in the accompanying drawing, which also provides for the method of packing the allotment of Stores and half wroughts allowed to a Battery; all these details have been entered, in the same sheet with the drawing, in

* Page 1019.

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order that, should the arrangement be approved, simil drawings may be circulated to the Regiment in this comple state, for general guidance, thus ensuring uniformity in th stowing of these Carts.

(b) Vide letter No. 774, from the Secretary Military Board to the Brigadier Commandant of Artillery, dated 26th February, 1850, forwarding copy of a letter No. 86, from Brevet Captain R. E. Little, Acting Commissary of Ordnance, Bangalore, requesting to know "the dimensions of the Chests for Tools required for the Artillery."

3. The Committee take this opportu nity of recommending that the boxes o the dimensions shown in the drawing o the Artificers' Cart be taken as the pat tern [b] for all Regimental Artificers' Too Boxes.

Purport of Letter No. 1121, *from the Secretary Military Board, to the Brigadier Commandant of Artillery, dated* 15*th March,* 1850.

With reference to Extract from Proceedings of the Permanent Artillery Select Committee, Meeting No. 159, Article 549, dated 28th February last, the Military Board entirely concur in the preference given to that mode of packing Store and Artificers' Carts of which a drawing has been submitted by the Committee, the Board wish to ascertain that the Committee have fully agreed as to the pattern of the Cart.

ARTICLE 550.

Instrument for laying Mortars, proposed by Corporal D. Clarke, 2d Battalion Artillery.

An Instrument for taking the centres, elevating and laying Mortars all in one, proposed by Corporal D. Clarke, of the 2d Battalion Artillery, which was recommended [a] to be tried at the Annual Artillery Practice in 1850, having been used throughout the Practice in the Mortar Battery, the Reports of the several Commanding Officers are laid before the Committee.

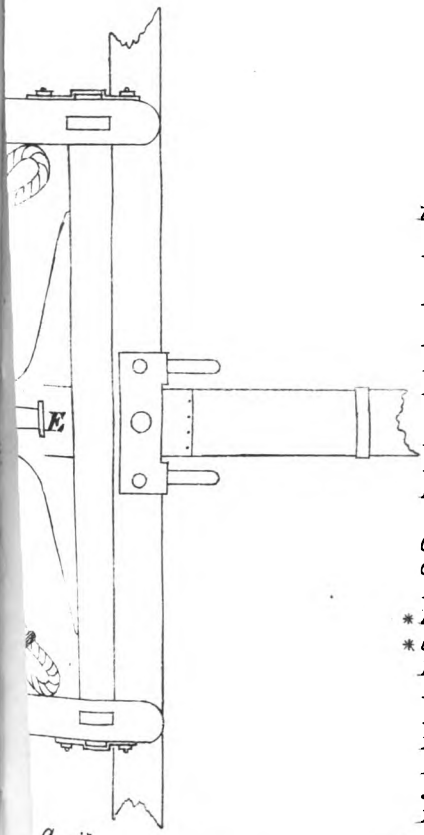
(a) Meeting 157, Article 535.*

2. Opinion.—The Committee recommend that the Instrument be altered as proposed by the Commanding Officers of Batteries in the Reports herewith appended, and that the

* Page 989.

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...tment of Artificers Tools as ...th September 1847.



A. Anvil
B. Box open shewing the partitions
C. Box shut
D. Standing Vice
E. Two Beak Irons
F. Rings on each side of the Boxes to lash the rope handles to them.

Box № 2.

Partition 1	Wax Bees	lb ¼
" 2	Solder brass	¼
	" " pewter	1
" 3	Borax	¼
	Salamoniac	¼
" 4	Brass old	3
" 5	Thread cotton	¼
" 6	Punches steel (3 smiths)	4
" 7	Gravers for Brass	6
" 8		
Bellows country with pipes and tue irons pairs		2
Chissels cold		6
Compasses iron common		2
" " " calipers		2
* Files of sorts		30
* Gravers for iron		6
Hammers hand		2
" riveting		2
" sledge		2
Iron old		lbs 50
Leather tannery	hide	½
Nail tools		2
Plates screw with taps medm		1
* Rasps half round		4
Steel cast		lbs 10
Tongs smiths		4
Brass sheet		lbs 2
Plates screw with taps small		2

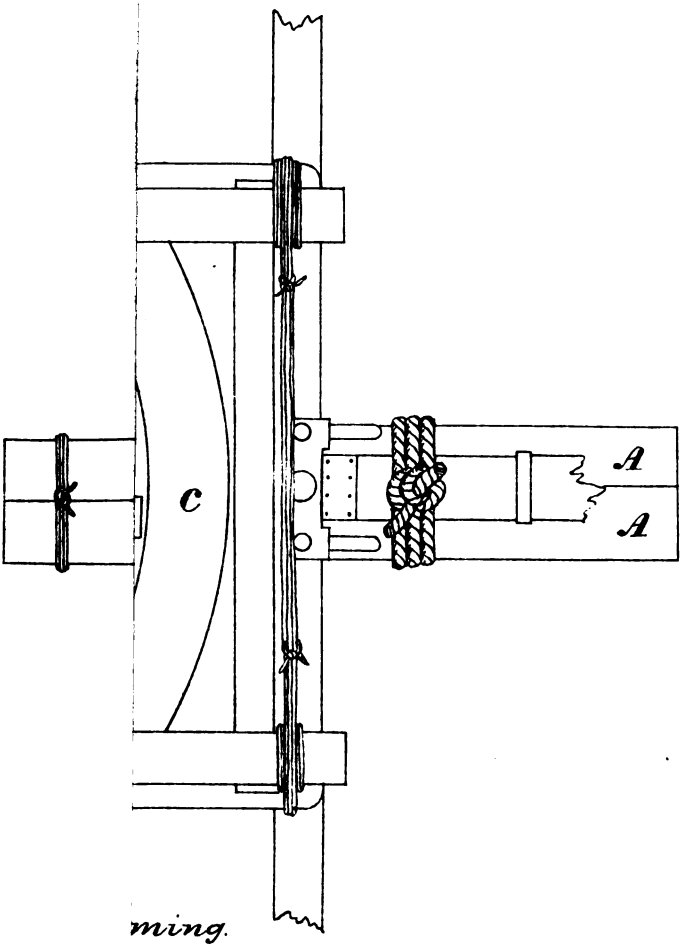
* These Articles are secured inside the front and ends of № 2 by wooden battens.

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Honorable the Court of Directors be moved to sanction six of these Instruments being constructed in England by a professional Instrument maker, for further trial and report by the Permanent Artillery Select Committees in the Bengal, Madras, and Bombay Artilleries.

OPINIONS OF THE OFFICERS COMMANDING THE MORTAR BATTERY, DURING THE ARTILLERY PRACTICE FOR 1850, ON CORPORAL CLARKE'S INSTRUMENT FOR LAYING MORTARS.

Lieut. Col. Foord.—Corporal Clarke's Instrument combines the spirit Level and Quadrant, and renders the use of the Plummet unnecessary, the Mortar is quickly laid, and the greatest accuracy may be depended upon, it is portable and not likely to get out of order. The present instrument has not been so well constructed as it might be, there are several defects which can easily be remedied, and in my opinion it is an instrument well worthy of introduction into the Service.

Major Begbie.—I consider the *principle* of the instrument extremely good: there are various defects in it which could be remedied by its being constructed by a regular instrument maker, such as the imperfection of the graduation of the quadrant, too great play of the bar, &c., and a slit at the further end would be an improvement over the present knife edge sight, which hides so thin an object as a flag staff. The instrument is portable, ensures accuracy of laying, combined with marked increase of celerity, and I consider it well worthy of being introduced into the service, on the removal of the slight imperfections adverted to.

Major Croggan.—No. 4, 8 Inch Mortar was readily laid by means of the instrument, the method of taking the direction by means of sights is very satisfactory, the usual method by plummet being uncertain, many good shells were thrown from this Mortar, others failed, which I attribute to the circumstance of the Arm on which the sights are placed not working truly on the pivot, I am therefore of opinion that the instrument should be made as perfect as possible and submitted to further trial, as I consider it too good a thing to be given up altogether; there is also a defect in the Quadrant,as 44½ degrees by Corporal Clarke's Instrument, were found to agree

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with 45 degrees taken with the other Quadrants. The iron rests which enter the bore of the mortar should be made longer and the screw underneath which tightens the plate to the bore should be somewhat larger, the present screw being difficult to handle.

Extract from the Artillery Practice at Head Quarters in 1848, *with a* 13 *Inch Iron Mortar.*

Flags' Distance.	Actual Range.	Given Distance. Over.	Given Distance. Under.	From the Line. Right.	From the Line. Left.	REMARKS.
450	532	82	0	0	8	In the above 39 shots 25 were over, averaging 26 yards, and 14 shots were under, averaging 32 yards, 29 shots were to the right averaging $12\frac{3}{5}$ yards, and 10 shots were to the left averaging $8\frac{9}{10}$ yards. Taking the above as a general average of the Practice with other calibres, it is evident that the common way of laying a Mortar with the Plummet at 45° is true enough for all practical purposes, and that little would be gained by any instrument for that purpose *however correct* or *however superior* to the plummet, for the Shell would still fall short or over the object aimed at, as much as at present. In other words the uncertainty of Mortar Practice is more in the charge than in the aim. (Sd.) P. MONTGOMERIE, Brigr.
	528	78	0	$8\frac{1}{4}$	0	
	515	65	0	0	3	
500	503	3	0	8	0	
	524	24	0	0	$\frac{1}{3}$	
	515	15	0	0	$\frac{1}{3}$	
550	438	0	112	1	0	
	574	24	0	14	0	
	578	28	0	20	0	
550	$552\frac{2}{3}$	$2\frac{2}{3}$	0	1	0	
	589	39	0	13	0	
	$553\frac{1}{3}$	$3\frac{1}{3}$	0	14	0	
600	622	22	0	Line		
	622	22	0	0	22	
	652	52	0	14	0	
600	558	0	42	8	0	
	575	0	25	10	0	
	587	0	13	4	0	
650	627	0	23	26	0	
	630	0	20	17	0	
	628	0	22	18	0	
650	644	0	6	11	0	
	690	40	0	$11\frac{2}{3}$	0	
	711	61	0	8	0	
700	712	12	0	2	0	
	708	8	0	0	$5\frac{1}{2}$	
	712	12	0	6	0	
700	630	0	70	11	0	
	718	18	0	8	0	
	710	10	0	4	0	
800	774	0	26	36	0	
	809	9	0	0	5	
	804	4	0	0	26	
900	881	0	19	16	0	
	911	11	0	0	14	
	888	0	12	0	5	
1000	991	0	9	$24\frac{2}{3}$	0	
	991	0	9	3	0	
	1006	6	0	54	0	

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MINUTE BY CAPTAIN A. F. OAKES.

I anticipate no advantage to Artillery Service from the introduction of this Instrument. On examining several Tables of Practice, I find that the distance of the shells' lodgement measured laterally from the line of direction is considerably less than the distance of the shells' lodgement beyond or short of the object aimed at. I therefore prefer the plummet, as with it, a mortar can be laid true enough for all service purposes.

(Signed) A. F. OAKES, Captain.

15*th March*, 1850.

REMARKS BY THE BRIGADIER COMMANDANT.

I have no idea that any Instrument will supersede the plummet for laying Mortars, but certainly the invention of Corporal Clarke reflects great credit on his ingenuity, it is the best thing of the kind I have seen, and he is deserving of encouragement, I therefore do not oppose the Instruments being made up in England as recommended by the Committee, I believe Corporal Clarke has been at some personal expense in constructing the Instrument, and I therefore recommend that he receive some remuneration for what he has done. The Instrument to be sent to the Military Board with these Proceedings.

(Signed) P. MONTGOMERIE, Brigadier.

16*th March*, 1850.

Letter No. 1345, *from the Secretary Military Board, to the Brigadier Commandant of Artillery, dated 26th March*, 1850.

The Military Board having it in contemplation to bring to the notice of Government and to favorable consideration the zeal of Corporal Clarke in inventing the Spirit Level and Quadrant, reported on by the Artillery Select Committee, dated 28th February, 1850, Meeting 159, Article 550, I have the honor by desire of the Military Board, to request you will be

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good enough to ascertain and state the expense to which the Corporal was put to, in preparing the instrument, as also what amount of remuneration he should receive for the invention.

2. The Board will be prepared to recommend to Government six of the above instruments being indented for on England, and sent for further trial, so soon as the information now called for is received.

ARTICLE 551.

WROUGHT IRON CARRIAGES FOR 5½ INCH BRASS MORTARS.

The wrought Iron Carriages for 5½ Inch Brass Mortars proposed by Captain A. F. Oakes, Captain and Major P. Anstruther, C. B., and Captain J. Maitland having been constructed as recommended (b) by the Permanent Artillery Select Committee, they were submitted to Proof on the morning of the 18th February, 1850, in the presence of the Select Committee.

(b) Meeting 158, Article 542.*

2. The Carriage proposed by Captain Oakes was constructed at the Artillery Depôt, and those by Major Anstruther, C. B., and Captain Maitland at the Gun Carriage Manufactory.

3. OPINION.—In examining the Proof Report of these Carriages, the Committee observe, that in the first five rounds at 6° Captain Oakes' Carriage recoiled one foot and a half more than Captain Maitland's; at 11° and at 6° the recoil was equal; at 16° and at 60° when these Carriages were converted into Mortar Beds by removing the wheels, there was no perceptible recoil with either of them.

4. During the remainder of the proof the recoil of Captain Maitland's Carriage was rather more lively than that of Captain Oakes'; but upon the whole, the recoil of these pieces may be considered about the same, the difference in either case being so very trifling, as to be of no consequence.

5. With regard to Major Anstruther's Bed, its recoil was one foot eleven inches more, with the same charge and elevation, than that of either of the other two (when used as

* Page 1005.

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beds) : with charges of 6 ozs. 10 drs., and 10 ozs. at 45°, no comparison can be drawn, as the two Carriages were fired on wheels, and Major Anstruther's as a Mortar Bed; the two Howitzer Carriages when without wheels, used as beds, are lighter than Major Anstruther's bed, and altogether steadier as Mortar Beds. The weights of the three are as follows :

	Cwts.	qrs.	lbs.
Captain Oakes', - - - -	1	1	13
Major Anstruther's, - - -	1	2	14
Captain Maitland's, - - -	1	1	23

6. Captain Oakes has brought to the notice of the Committee, that in consequence of the long axle arms of his Carriage (which were necessary to adapt it to a pair of experimental wheels taken from an old Palanquin Coach) its weight is entered in the above table at 9½ lbs. more than it would have weighed, had its axle arms been of the proper length; a further deduction therefore should be made in drawing a comparison in the weights between his carriage and that of Captain Maitland's of 9½ lbs.

7. The Committee in adverting to their former Proceedings upon the subject of these Carriages observe their recommendation to have been, that one of each of these patterns of Carriages should be constructed and afterwards proved in their presence; the fact of a pair of old Palanquin Coach wheels having stood the severe proof may be of practical use hereafter, when considering the scantling of wood proper to be used for the wheels of new carriages, carts, &c., which the Committee are inclined to think are at present too heavy; but they are of opinion that all three carriages should be submitted to them in a complete state, to enable them to form a fair judgment upon the question before them. The Committee therefore recommend, that Captain Oakes be authorized to complete his carriage with whatever wheels he may consider best adapted to it, and that all the three carriages may undergo such alterations and modifications as the Officers who submitted them may think fit to make, before they are again brought before the Committee for final report.

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Report of a Proof of the undermentioned Carriages and Beds for 5½ Inch of Artillery, recommended to be constructed by the Permanent Artillery

DESCRIPTION.	No. of Carriages or Beds.	No. of Firings.	Nature and strength of Powder.	Marks on the Mortars.	Marks on the Carriages or Beds.	cwt.	qrs.
Captain A. F. Oakes' Experimental Iron Carriage for 5½ Inch Brass Mortar to be used as a Howitzer Carriage.....	1	5 5 5 6 1 1 1 2 1 2	Madras M. P. June, 1848, Pit. Pressed and Glazed. P. A. Superintendent 8 Inch Iron Mortar. Charge 11lb. Proof Range 774.	No. 75, G. Hutchinson, Fort William, 18 1833.	A. F. O. 1850 No. 1.	1	2
Captain Maitland's Experimental Iron Carriage for 5½ Inch Brass Mortar on Captain Oakes' principle.....	1	5 5 5 6 1 1 1 2 1 2		No. 84, G. Hutchinson, Fort William, 25 1833.	J. M. 1850 No. 1.	1	2
Major P. Anstruther's Experimental Iron Mortar Bed for 5½ Inch Brass Mortar.....	1	5 5 5 6 1 1 1 2 1 2		No. 73, G. Hutchinson, Fort William, 16 1833.	J. M. 1850 No. 1.	1	2

Captain Oakes' axle bent during the last 3 rounds, but did not break, Captain M
A pair of old common Palanquin Carriage wheels of 34 inches diameter, were used

ARTILLERY DEPOT,
Saint Thomas' Mount,
18*th February*, 1850.

(Signed) P. MONT
Comm

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...Mortars, by order of Colonel P. Montgomerie, C. B., Brigadier Commandant ...Committee in Meeting 158, Article 542, 7th December, 1849.

Weight of Carriage or Bed.			Charge.		Shell.		Time of Flight.		Elevation.		Recoil.		Time in Firing.	REMARKS.
tons.	qrs.	lbs.	ozs.	drs.	lbs.	ozs	sec.	pts.	D.	M.	Ft.	ins.		
			5	0	16	0	2	0	6	0	12	0		On Wheels as a Howitzer Carriage.
			5	0	,,	,,	3	30	11	0	9	6		
	Without Wheels.		5	0	,,	,,	4	45	16	0	9	0		Without Wheels as a Mortar Bed.
			5	0	,,	,,	16	15	60	0	0	1		
	1	13	5	0	,,	,,	5	0	15	30	9	6		On Wheels.
			5	0	,,	,,	5	0	15	0	9	0		
			5	0	,,	,,	6	0	17	0	9	0		
			6	10	,,	,,	0	0	45	0	7	6		
			10	0	,,	,,	0	0	45	0	10	0		* Wheels are omitted as those used were Experimental ones not adapted to the Carriage.
			5	0	16	0	2	0	6	0	10	6	2 Hours and a Quarter.	On Wheels.
			5	0	,,	,,	3	30	11	0	9	6		
	Without Wheels.		5	0	,,	,,	5	0	16	0	9	0		As a Mortar Bed.
			5	0	,,	,,	16	15	60	0	0	1		
	2	14	5	0	,,	,,	4	0	15	30	12	8		
	With Wheels.		5	0	,,	,,	5	0	16	0	10	0		On Wheels.
	2	4	5	0	,,	,,	5	30	17	0	10	0		
			6	10	,,	,,	0	0	45	0	8	0		
			10	0	,,	,,	0	0	45	0	12	0		
			5	0	16	0	2	15	6	0	5	6		As a Howitzer Carriage.
			5	0	,,	,,	3	15	11	0	5	0		
			5	0	,,	,,	4	30	16	0	4	0		
			5	0	,,	,,	16	0	60	0	2	0		As a Mortar Bed.
	1	23	5	0	,,	,,	5	0	15	30	3	0		
			5	0	,,	,,	5	0	16	30	4	0		As a Howitzer.
			5	0	,,	,,	6	0	18	0	4	0		
			6	10	,,	,,	0	0	45	0	3	0		
			10	0	,,	,,	0	0	45	0	5	0		As a Mortar Bed.

...d's also bent and after the 3d round the axle was found to be broken in two places. ...Captain Oakes' Carriage, they stood the test without injury.

(Signed) A. F. Oakes, Captain,
Director Artillery Depôt.

...ie, Brigadier,
...*of Artillery.*

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Extract from Letter No. 1062, *from the Secretary Military Board, to the Brigadier Commandant of Artillery, dated* 15*th March,* 1850.

In reference to Article 551, in Meeting 159, of the Artillery Select Committee, the Board have decided "on the alterations to their experimental carriages being executed at the Gun Carriage Manufactory, under the Superintendent, but permit the three Officers, viz., (Major Anstruther, C. B., Captain Maitland and Captain Oakes) to have any alterations made to these Carriages, which they may wish to have effected, merely specifying in a Memorandum, to be sent through you to the Board, the general nature of the alterations, and with permission for the Officers named, to visit the Manufactory from time to time, and to request the Superintendent to leave off making any changes which on inspection they may think likely to affect the Carriages, it being clearly understood that the Superintendent shall perform the work on the three Carriages simultaneously."

ARTICLE 552.

EXPERIMENTAL CARRIAGE FOR ALL LIGHT FIELD ORDNANCE, SUGGESTED BY MAJOR ANSTRUTHER, C. B., VIDE MEETING 157, ARTICLE 533.*

Extract from Letter No. 367, *from the Secretary Military Board, to the Brigadier Commandant of Artillery, dated* 25*th January,* 1850.

The Superintendent of the Gun Carriage Manufactory, having reported that he has in part altered the Light Field Carriage for all calibres proposed by Major Anstruther, C. B., and expressed a wish that it should be proved before proceeding further, I have the honor under the Military Board's orders to request that you will be good enough to submit it

* Page 986.

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to such trials as may seem best calculated to ascertain its efficiency, and report the result for the Board's information.

Letter No. 75, *from the Brigadier Commandant of Artillery, to the Secretary Military Board, dated* 8*th February,* 1850.

In acknowledging the receipt of your letter, dated 25th ultimo,(*) I have the honor to report that the Carriage for all Light Field Ordnance proposed by Major Anstruther, C. B., therein alluded to, has been received at the Artillery Depôt from the Gun Carriage Manufactory with the 6 Pounder cheeks only.

(a) No. 367.

2. The Permanent Artillery Select Committee in Meeting 157, Article 533, under date the 17th September, 1849, recommended that this carriage after being altered should undergo an ordinary proof with a 24 Pdr. Howitzer and 9 Pdr. Gun, to which proof I consider the carriage should now be subjected, and beg to suggest that the Superintendent Gun Carriage Manufactory be instructed to send the cheeks of the 24 Pdr. Howitzer and 9 Pdr. Gun to the Artillery Depôt, together with artificers to place those for the 24 Pdr. Howitzer on the carriage.

3. I would likewise suggest that, when the Superintendent makes alterations in Gun Carriages, he be required to accompany the same, when sending them up for proof, with a memo. for my information showing the nature of the alterations; this is very necessary inasmuch as it ensures minute attention being given to the particular parts that have been altered.

Letter No. 649, *from the Secretary Military Board, to the Brigadier Commandant of Artillery, dated* 15*th February,* 1850.

I have the honor by order of the Board, to acknowledge the

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receipt of your letter of the 8th Instant, and to inform you, that instructions have been given to the Superintendent of the Gun Carriage Manufactory to comply with the suggestions of your 3d Para.

2. In your 2d Para. you suggest, that the Superintendent of the Gun Carriage Manufactory should send up the 24 Pdr. Howitzer cheeks for trial, but these are not yet begun upon, and the Board do not now wish a complete proof of the 6 Pdr. Carriage, but would wish the opinion of the Select Artillery Committee, as to the Carriage in its present state, merely as to its facility of limbering up, its weight, its length, its steadiness on uneven ground, and, by 2 or 3 rounds of service charge, its steadiness or otherwise of recoil; the particular alterations that have been made will be furnished you by the Superintendent of the Gun Carriage Manufactory.

Extract from a Letter No. 126, *from the Superintendent Gun Carriage Manufactory, to the Director Artillery Depôt, dated* 21*st February,* 1850.

I have the honor to annex for the information of the Commandant of Artillery a Memorandum showing the alterations made to the Light Field Carriage with Iron cheeks for all calibres.

MEMORANDUM OF ALTERATIONS MADE TO A LIGHT FIELD CARRIAGE WITH IRON CHEEKS FOR ALL CALIBRES.

	Original Dimensions.	Present Dimensions.
Length of Beam, - - - -	8 feet 5 inches	8 feet 8½ inches.
Thickness at the Elevating Screw Cradle, - - - - -	4⅛ inches	4 inches.
Thickness of the Trail, - -	4½ inches	3½ inches.
Breadth at the point of the Trail, -	6¾ inches	5½ inches.
Length of the Iron Cheeks measured horizontally, - -	26½ inches	18 inches.

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	Original Dimensions.	Present Dimensions.
Centre of Axle and centre of Trunnions, - - - - -	Vertical	3 inches to the front.
Height of Iron Handspike from the ground, - - - - -	28½ inches	24 inches.
Number of side Bolts, - -	5	3

2. Opinion.—By the Comparative Table hereto appended, it will be perceived that the Carriage may now be limbered up with greater facility, the trail, when at the limbering up height, being 14 lbs. lighter than before, and only 6 lbs. heavier than the trail of the Select Committee Pattern; the length of the trail is the same as before, viz.: 7½ inches shorter than that of the Select Committee Pattern; the carriage is steady in its recoil; the placing the trunnion holes 3 inches in advance of their old position is a great improvement.

3. The proof given was five rounds P. B. on ordinary ground, with service charge, and two high junk wads, one between the powder and shot, and one over the shot.

The average recoil of Light Field 6 Pdr. Carriages at proof is from 3 to 4 feet.

This Carriage recoiled..... 4 feet.

Upon the whole, the Carriage is much improved.

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Table showing a comparison between Major Anstruther's Experimental Carriage for all Light Field Ordnance, before and after Alteration, as recommended by the Permanent Artillery Select Committee, in Meeting 157, *Article* 533, *and that of the Artillery Select Committee Pattern.*

		6 Pounder Gun Carriage.		
		Artillery Select Committee.	Major Anstruther's originally.	Major Anstruther's after alteration.
1. Axis of the Bore from the ground, P. B.	inches	$46\frac{1}{10}$	$35\frac{7}{10}$	37
2. Angle of Trail,	degrees	$18\frac{1}{2}$	$14\frac{1}{2}$	$14\frac{1}{2}$
3. Length of Trail from rear of Axletree Bed to where it touches the ground,	inches	$97\frac{1}{2}$	90	90
4. Length of Axle from shoulder to shoulder,	inches	44	34	34
5. Weight required to raise the Trail one inch from the ground,	lbs.	194	214	200
6. Weight of Carriage,	cwt.	12-2-4	11-1-18	10-1-15
7. Weight required to raise the Trail off a prop 26 inches high, as for limbering up,	lbs.	164	208	180
8. Weight required to raise the pole off a prop 41 inches high, the height when in draught,	"	44	45	$41\frac{1}{2}$
9. The centre of trunnions with reference to the centre of axletree, when the trail is on the ground, how much in front of, ascertained by dropping a perpendicular from the centre of trunnions and marking where that line cuts the centre of axletree,		Centre of trunnions ·4 of an inch in front of centre of axletree.	Centre of trunnions and centre of axletree in one vertical line.	Centre of trunnions 3 inches in front of centre of axletree.

Artillery Depôt,
Saint Thomas' Mount,
28*th February*, 1850.

A. F. OAKES, Captain,
D. A. D.

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Letter No. 1155, *from the Secretary Military Board, to the Brigadier Commandant of Artillery, dated* 15*th March,* 1850.

I have the honor to acknowledge the receipt of the Extract from Proceedings of the Artillery Select Committee, reporting on the Carriage for all Light Field Pieces tried on a 6 Pounder, and am directed by the Military Board to request you will send the Carriage down to the Gun Carriage Manufactory, the Superintendent of which will now construct the Iron cheeks for this Carriage as a 12 Pounder Howitzer Carriage for trial and report.

ARTICLE 553.

ON THE SUBJECT OF REDUCING THE NUMBER OF THE DIFFERENT KINDS OF ELEVATING SCREWS IN USE WITH HEAVY AND LIGHT FIELD ORDNANCE.

Letter No. 113, *from the Secretary Military Board, to the Brigadier Commandant of Artillery, dated* 11*th January,* 1850.

I have the honor by order of the Board to request you will favor the Military Board with your opinion and that of the Select Committee of Artillery, as to the necessity of having so many elevating screws upon the books and the propriety of making such a number of various patterns.

2. In the margin I have noted those elevating screws now in the various Arsenals, showing 17 different screws, the Superintendent of the Gun Carriage Manufactory gives his opinion in his letter which I forward herewith that 4 screws might with advantage be used throughout the service, viz.:

Carronade	32	Pdr.
,,	18	,,
,,	12	,,
Gun	32	,,
,,	24	,,
,,	18	,,
,,	12	,,
,,	9	,,
,,	6	,,
,,	3	,,
Howitzer	5⅘	Inch.
,,	4⅗	,,
,,	12	Pdr.
Mortar	13	Inch.
,,	10	,,
,,	8	,,
,,	5⅓	,,

One Heavy Field Gun,
One Light Field do.
One Heavy Mortar,
One Light Mortar.

These he has now constructed and I am directed by the

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Board to request that you will send for them and report upon the subject.

Letter No. 262, from the Superintendent Gun Carriage Manufactory to the Secretary Military Board, dated 6th October, 1849.

With reference to your letter of the 25th ultimo, No. 1723, I have the honor to state that there are elevating screws for all the different descriptions of calibres in use of different sizes and of different patterns.

As it is the Board's wish to reduce the many heads under which Elevating Screws are classed in the Ordnance Books, I would recommend that the practice at the Manufactory be adopted in all Arsenals, viz., to bring all old, or second-hand, elevating screws not belonging to Carriages on the books, as old iron, and those, that are made spare for Carriages, or Mortar Beds, should be brought on the returns under four heads, viz.:

Elevating Screws	Heavy Field Carriages.
Do.	Light do. do.
Do.	Heavy Mortar Beds.
Do.	Light do. do.

The dimensions of the Elevating screws of the several pieces of Ordnance classed Heavy and Light should be as follows:

Heavy Field.			Elevating Screw length from below the head to the end.	Elevating Screw Diameter.
Iron Carronades	68	Pounder,	15 Inches.	2 Inches.
Do.	42	,,		
Do.	32	,,		
Do.	24	,,		
Do.	18	,,		
Do.	12	,,		
Iron Gun	56	,,		
Do.	42	,,		
Do.	32	,,		
Do.	24	,,		
Do.	18	,,		
Do.	12	,,		
Do.	10	Inch,		
Do.	8	,,		
Iron Howitzer	10	,,		
Do.	8	,,		

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Light Field.		Elevating Screw length from below the head to the end.	Elevating Screw Diameter.
Brass Gun	9 Pounder.	15½ Inches.	1¾ Inches.
Do.	6 „		
Do.	3 „		
Brass Howitzer	24 „		
Do.	12 „		
Do.	5½ Inch.	Obsolete.	
Do.	4⅘ „		
Light Mortar.			
Brass Mortar	5⅘ Inch.	10½ Inches.	1¼ Inches.
Do.	4⅘ „		
Heavy Mortar.			
Iron Mortar	13 Inch.	Have Quoins.	
Do.	10 „		
Do.	8 „		
Brass Mortar	13 „	Obsolete.	
Do.	10 „		
Do.	8 „		

Four sizes of Elevating Screws are amply sufficient for the whole service.

I have looked through the Returns of my Department and find that it is not practicable to reduce any other articles of Store remaining on the Books.

Letter No. 11, *from the Superintendent Gun Carriage Manufactory, to the Secretary Military Board, dated* 8*th January,* 1850.

I have the honor to report the completion of the four elevating screws with boxes and bolts complete ordered in your letter No. 1859, of the 12th October last, and to request the Board's instructions regarding them.

The dimensions, weight, and cost are as follows:

	Length. Inches.	Diameter. Inches.	Weight. lbs.	Cost. Rs.	A.	P.
Heavy Field Gun,.....	15	2	26 5/16	36	6	1
Light do.	15½	1⅞	16⅜	28	6	2
Heavy Mortar,.....	16	2	31	37	1	2
Light do.	10½	1½	7 11/16	20	6	1

2. Opinion.—The Committee observe that the four elevat-

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ing screws submitted are of the same dimensions as those now established in the Madras Artillery with the Heavy Mortar, the Light Mortar, the Heavy Field Carriage, and the Light Field (Artillery Select Committee Pattern) in the following particulars, viz.:

1st. In the diameter of the cylinder.

2nd. In the angle of inclination of the thread of the screw to the base of the cylinder.

3rd. In the number of threads contained in a given number of inches.

4th. In the width of each thread.

5th. In the width of the groove between each thread, as will be seen by the following table:

Table showing the proposed Dimensions, &c. &c. of four Elevating Screws to answer for all Artillery Carriages and Beds that may hereafter be constructed.

	Diameter of the Cylinder.	Angle of inclination of the thread to the base of the Cylinder.	Number of inches containing 5 Threads.	Width of the Thread.	Width of groove between the Threads.
	Inches.	Degrees.	Inches.	Inches.	Inches.
Heavy Mortar,....	2·0	6½	2·0	·22	·23
Light Mortar,.....	1·5	8½	2·0	·22	·23
Heavy Field,.....	2·03	5¾	2·0	·22	·23
Light Field,.....	1·8	8	2·0	·22	·23

3. The Committee recommend the adoption of the three screws, viz.,—for the Light Mortar, the Heavy Field and the Light Field as above particularized for all future constructions; the screw for Heavy Mortars is not required, as they cannot be adapted to cast iron beds of the existing pattern.

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Letter No. 1120, *from the Secretary Military Board, to the Superintendent of the Gun Carriage Manufactory, dated* 15*th March,* 1850.

In reference to the former correspondence* I have now the honor to enclose the original Proceedings of the Artillery Select Committee, Article 553, Meeting 159, (to be returned,) in which they report that they consider 3 of the 4 elevating screws made up by you sufficient for all future constructions, but, whilst approving of this recommendation as far as it applies for the future, the Board observe that the Committee have neither noticed nor considered the practicability or means of rectifying the evil of having elevating screws of seventeen different descriptions in use, and the Board therefore request you will favor them with your opinion as to whether it is fairly practicable to replace all the different elevating screws now in use by those of the three now established patterns.

* No. 1861, 12th October, 1849, and No. 113, 11th January, 1850.

To

The Commandant of Artillery, for communication to the Artillery Select Committee.

ARTICLE 554.

ON THE SUBJECT OF AXLETREES, WITH A VIEW TO ESTABLISHING SIMPLIFICATION AND UNIFORMITY OF PATTERN.

Letter No. 435, *from the Brigadier Commandant of Artillery, to the Secretary Military Board, dated* 4*th October,* 1849.

It having been brought to my notice that there are still several Ordnance Carriages and Waggons in use and in Store with screw nuts on the end of the axle arms, I have the honor to suggest that instructions may be given to have the whole altered, so as to receive linch pins and washers of the established pattern in lieu thereof, as recommended in my predecessors's letter* under date, 30th June last, para. 4.

* No. 258.

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Letter No. 2002, from the Secretary Military Board, to the Brigadier Commandant of Artillery, dated 26th October, 1849.

I have the honor to enclose a report* from the Superintendent of the Gun Carriage Manufactory on the alterations requisite to give effect to the suggestions made in your letter No. 435, of 4th October, 1849, for making alterations in the axletree arms of certain Carriages to adapt them to receive linch pins and washers of the established pattern.

* Dated 19th October, 1849, No. 284, to be returned.

2. I am also desired to transmit in original another report* of 19th October, and drawings† from the Superintendent of the Gun Carriage Manufactory describing the different axletrees in use with different descriptions of Carriages, and to request that you will direct the question of axletrees to be brought before the Artillery Select Committee for report and consideration with a view to carrying into full effect that simplification and uniformity of patterns which have so long been considered a great desideratum in the Artillery service.

* To be returned.

Letter No. 284, from the Superintendent Gun Carriage Manufactory, to the Secretary Military Board, dated 19th October, 1849.

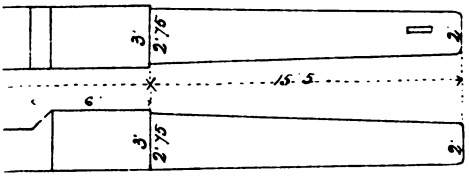
To carry out the suggestions of the Brigadier Commandant of Artillery referred to in your letter of the 9th Instant, No. 1811, I would recommend that the axle arms of all carriages and limbers whose wheels and axles fit one another be altered to the size of the axle arm of the Artillery Select Committee Pattern, and the washer and linch pin for that pattern substituted for the screw nuts.

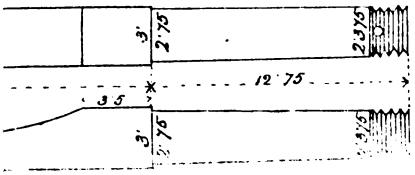
Every carriage and limber that has come into the Manufactory for repair or alteration since the screw nut was abolished has had washers and linch pins substituted for their screw nuts.

† Plates 3 and 4.

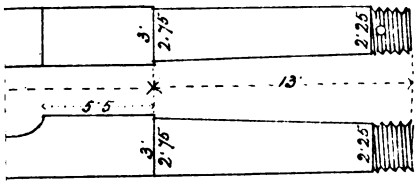
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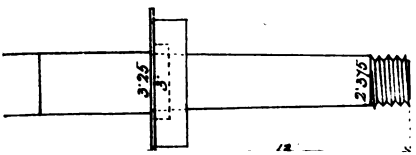
Carriages.

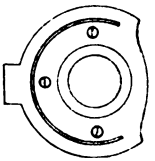




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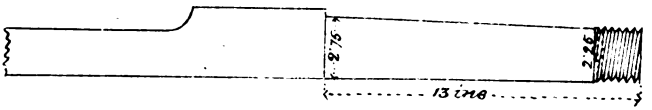
Artillery Select Comm

Supplement to Article

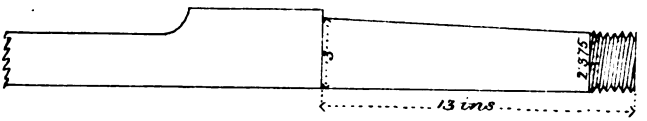
Axle Arms of Lt. Fd. Car

Lt. Col. Cullens Patter

for 6 Pdr. Gun & 12 Pdr. Howit.

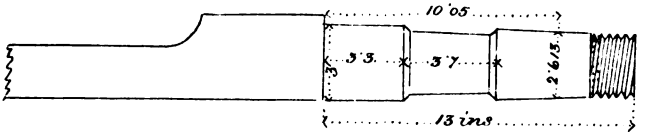


for 9 Pdr. Gun & 24 Pdr. Howitr.



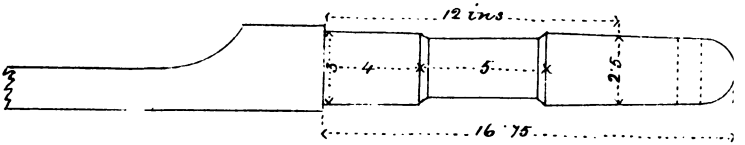
Special Board Pattern,

for 6 & 9 Pdr. Gun & 12 & 24 Pdr. Howitzr.



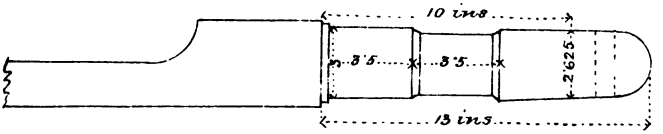
G. O. G. 1842 Pattern

for 6 & 9 Pdr. Gun & 12 & 24 Pdr. Howitzer.



Artv. Selt. Comittee Pattn.

for 6 & 9 Pdr. Gun & 12 & 24 Pdr. Howitzer.

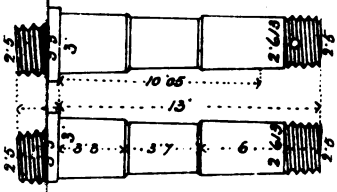


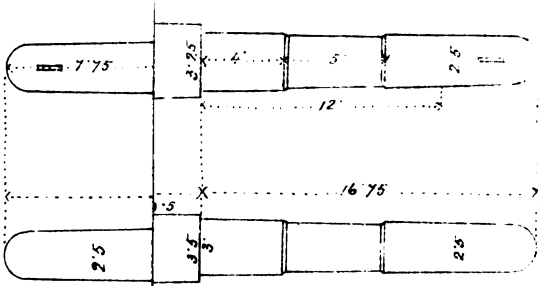


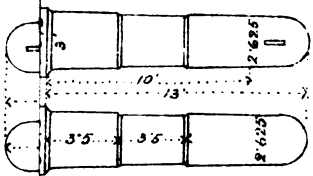
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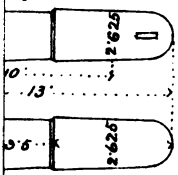
Madras Artv. Depôt.

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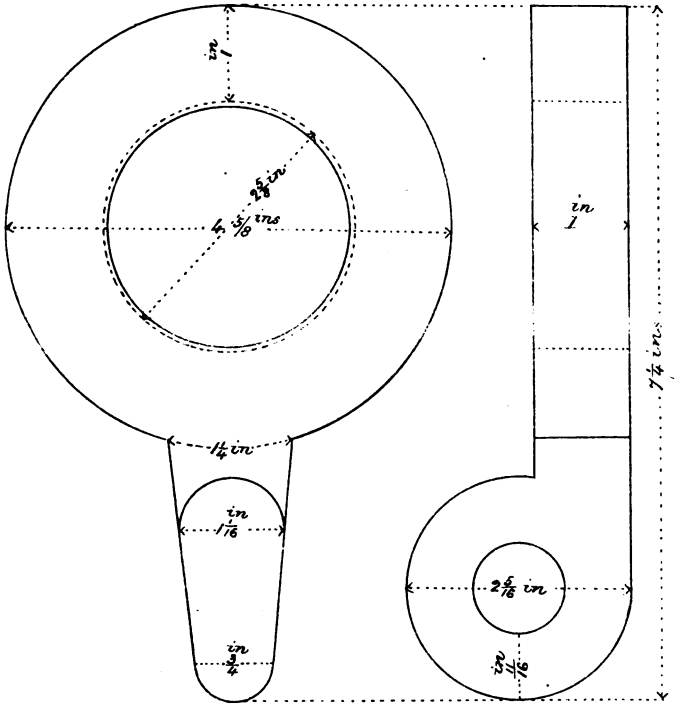
Plate

Artillery Select Committee

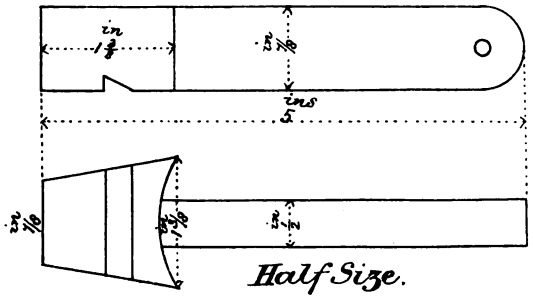
Meeting 159, Article 554.

Artly Select Committee Pattern,

Eye Washer.



Linch Pin



Half Size.

Madras Arty. Depôt

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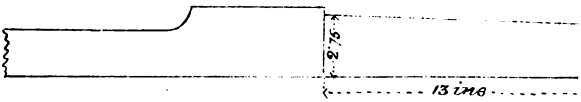
Artillery Select Comm

Supplement to Article 55

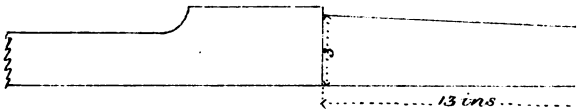
Axle Arms of Lt. Fd. Carr

Lt. Col. Cullens Pattern

for 6 Pdr. Gun & 12 Pdr. Howitr.

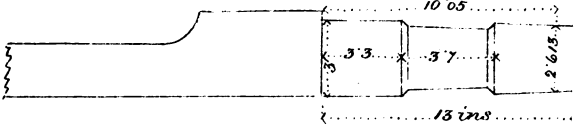


for 9 Pdr. Gun & 24 Pdr. Howitr.



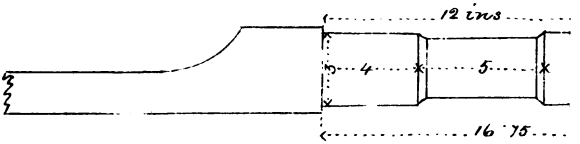
Special Board Pattern

for 6 & 9 Pdr. Gun & 12 & 24 Pdr. How



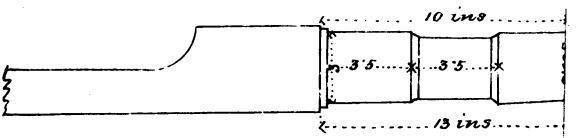
G. O. G. 1842 Pattern

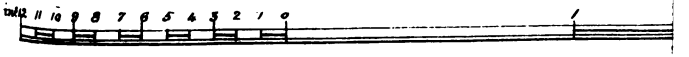
for 6 & 9 Pdr. Gun & 12 & 24 Pdr. How



Artly. Selt. Comittee Pat

for 6 & 9 Pdr. Gun & 12 & 24 Pdr. Hon





Madras Artly. Depôt.

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A drawing of the Artillery Select Committee pattern axle washer, and linch pin is herewith forwarded.*

Letter No. 283, from the Superintendent Gun Carriage Manufactory, to the Secretary Military Board, dated 19th October, 1849.

With reference to your letter of the 5th Instant No. 1766, I have the honor to forward the accompanying drawings of axletrees,† in use with the different patterns of Light Field Carriages, showing the dimensions and weights of each axletree.

The double cheek old pattern is the oldest of all patterns, and its wheels and axles are not applicable to any other pattern on account of the difference in the dimensions.

The Block trail old pattern is also a very old pattern, as the latest carriage made of this pattern is dated January 1830, and, though some of the dimensions coincide with Colonel Cullen's pattern, I am of opinion the wheels and axles of the block trail old pattern, will not conveniently suit any of the subsequent patterns.

The wheels and axles of the 6 Pdr. Gun and 12 Pdr. Howitzer, Colonel Cullen's pattern, will not fit any of the later patterns, in consequence of their dimensions being less. The wheels of the 9 Pdr. Gun and 24 Pdr. Howitzer may be made to answer the Special Board's, the Artillery Select Committee's, and Major Anstruther's, iron cheek patterns, with a slight alteration by having them reamed out a little to correspond with these patterns, which are $\frac{1}{8}$ inch greater in diameter at the end, but the wheels of these patterns will not fit Colonel Cullen's carriages on account of their having a collar attached to the friction plates, which becomes an obstruction to wheels of other patterns.

The Special Board's pattern wheels and axles are applicable to the Artillery Select Committee's and Major Anstruther's iron cheek pattern, and the wheels and axles of these, in like manner, will answer the Special Board's pattern, as well as one another.

* Plate 5. † Plates 3 and 4.

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The wheels of the G. O. G. 1842 pattern, will not at all suit any other pattern, on account of having a wooden nave; but the axle may be made to answer for brass naves, by having the arms shortened, but then, if this alteration be made, it will be at the sacrifice of the wheels.

2. The Committee observe by the reports laid before them, that

1st. The old double cheek pattern wheels and axles are not applicable to any subsequent pattern.

2d. The block trail old pattern ditto.

3d. Cullen's pattern for 6 Pounder Gun and 12 Pounder Howitzer, } ditto.

4th. Cullen's pattern 9 Pounder Gun and 24 Pounder Howitzer may be adapted to the Special Board, Select Committee, and Major Anstruther's Iron cheek, patterns by reaming out $\frac{1}{8}$ of an inch at the end. But the wheels of these patterns will not fit Cullen's Carriages on account of their having a collar attached to the friction plates.

5th. The Special Board, Artillery Select Committee, and Major Anstruther's Iron Cheek, patterns, will answer for one another.

6th. The G. O. G. 1842 pattern will not suit any other pattern.

3. Opinion.—The alterations may with advantage be made, adapting the wheels and axles to each other, as shown in the above Abstract from the Superintendent Gun Carriage Manufactory's Report.

ARTICLE 555.

On the Fitness of Saulwood for Ordnance Purposes.

Letter No. 48, *from the Brigadier Commandant of Artillery, to the Secretary Military Board, dated 24th January*, 1850.

I have the honor to report for the information of the Military Board that the Carriage noted in the margin now in the Field Train at this

J. M. 1848, No. 1.
9 Pounder reamed out.
12 Pounder Saul.

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station, is so much shrunk in the woodwork as to be quite unfit for issue in its present state.

2. The Carriage was received from the Manufactory in January 1849, was used at the practice at Artillery Head Quarters in 1849, and has been constantly under cover since then, except for about six weeks, during which time the Gun sheds at the Artillery Depôt were under repair.

Letter No. 486, *from the Secretary Military Board, to the Brigadier Commandant of Artillery, dated 29th January,* 1850.

I have the honor by order of the Board to request you will favor me with the opinion of the Select Committee upon the Saulwood Carriage described in your letter of January 24th, 1850, as so much shrunk as to be unfit for issue, to enable the Board to form an opinion on the fitness of that description of wood for Ordnance purposes. Its loss of weight will probably be found considerable and should be stated in the report.

Letter No. 504, *from the Secretary Military Board, to the Brigadier Commandant of Artillery, dated 6th February,* 1850.

I have the honor by desire of the Military Board, to transmit herewith true copy of a letter* from the Ordnance Officer at Bangalore explanatory of some defects in 12 wheels of waggons and waggon Limbers sent from the Mount for the D Troop which were lately repaired at that Station, and with reference to it to request, you will be so good as favor them with the opinion of the Select Committee of Artillery as regards the defects therein brought to notice.

* Dated 23d January, 1850.

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Extract from Letter No. 41, *from Captain R. R. Little, Acting Commissary of Ordnance Bangalore, to the Deputy Assistant Adjutant General in Mysore, dated Bangalore, 23d January,* 1850.

The wheels alluded to by the Board had the following defects:

The joints of the felloes were quite loose, and the inside of the same had shrunk more than the outside which, of course, required to be tightened. The whole of the tires of the 12 wheels had to be drawn up, they having become loose on the march.

The above wheels belonged to waggons and waggon Limbers, but none of the Gun Carriage or Limber wheels required any thing being done to them. I observed that the former were made of Saul and the latter of Teakwood.

2. Opinion.—It appears to the Committee after a minute inspection of the 12 Pounder Saulwood carriage, and from their general knowledge of the properties of Saulwood, that it is not the best description of timber for gun carriages; a very strong reason against retaining it in the Madras Artillery for Ordnance purposes, is its being more expensive than Teak, and the greater difficulty which there is in procuring it.

3. The Committee would suggest for consideration whether, instead of purchasing large beams of Saulwood, it would not be more likely to answer for Ordnance purposes, and be more economical to the state, if the wood were purchased in half wroughts on the spot.

4. With regard to drawing any comparison between the Saulwood, of which the 12 Pounder Carriage and Waggon wheels now under consideration were constructed, and Teak or other woods, it cannot be done without further information being laid before the Committee, regarding the system pursued by the Bengal Gun Carriage Agents, in seasoning their wood, before, and after, cutting it, into half wroughts;

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as so much must depend upon that operation being thoroughly and systematically performed.

5. The weights of the 12 Pounder carriage when built in 1848, and at present are,

		Carriage.	Limber.
Original Weight, - - -	cwts.	19 3 10	15 0 13
Present Weight, - - -	„	18 2 21	14 0 13
Difference, - - - - -	„	1 0 17	1 0 0

MINUTE BY CAPTAIN MAITLAND.

I do not coincide with the opinion of the Committee expressed in para. 3 of the above Article.

ARTICLE 556.

ON TWO EXPERIMENTAL BRASS NAVES OF REDUCED DIMENSIONS.

(a) No 597, 9th Feby. 1850, and Letters Supt. G. C. M. No. 65, 4th Feby. 1850. No. 83, 7th Feby. 1850.

The Military Board call(a) for a Report on two Brass Naves of reduced dimensions, which have been experimentally constructed for use with a break carriage as described in the following extract of a letter from Major Anstruther, C. B., dated 25th June, 1849.

"The following experiment, I think, will prove that we can "diminish considerably the price and weight of the brass "naves of our field pieces and thus obviate in a great mea- "sure the only objection yet made to them. The experiment "is simply to shorten the brass nave by cutting away metal "from each end, reducing the bearing, &c. &c."

2. The particulars of the reduction in the naves now submitted, will be seen in the communication from the Superintendent Gun Carriage Manufactory.

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Letter No. 65, from the Superintendent Gun Carriage Manufactory, to the Secretary Military Board, dated 4th February, 1850.

I have the honor to report for the Board's information the alterations that have been made experimentally to the Break Carriage authorized in your letter No. 2107, of the 13th November last, with a view to reduce as much as possible the weight of the present pattern Carriages.

	Original Dimensions.	Reduced Dimensions.	Original Weight.	Reduced Weight.
	Inches.	Inches.	lbs.	lbs.
Nave's length,	$9\frac{3}{4}$	7	$61\frac{5}{16}$	$51\frac{5}{8}$
„ diameter at the greatest end of the axle arm,	5	$4\frac{3}{8}$		
„ „ „ less end „	$4\frac{3}{8}$	$4\frac{3}{8}$		
„ thickness of the bottom plate at the outer rim,	$\frac{1}{8}$	$\frac{1}{8}$		
„ „ „ top plate „	$\frac{1}{8}$	$\frac{1}{8}$		
Axle arm length,	13	10	122	114
„ diameter at the greatest end,	3	3		
„ „ „ less „	$2\frac{3}{8}$	$2\frac{5}{8}$		
			$183\frac{5}{16}$	$165\frac{5}{8}$

The total saving in weight by this arrangement is $17\frac{11}{16}$ lbs.

Letter No. 83, from the Superintendent Gun Carriage Manufactory, to the Secretary Military Board, dated 7th February, 1850.

I have the honor to request the Board will have the goodness to order that the Break Carriage to which certain alterations have been made as reported in my letter No. 65, of the 4th instant, be tried at the Mount in such way as may be thought necessary, and a report submitted on it by the Artillery Select Committee as to whether the alterations made in its wheels may not be advantageously carried out in the present pattern carriages.

3. OPINION.—The Committee recommend that the break carriage be tried by all the three Commanding Officers of

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Battalions at Artillery Head Quarters and by the Officer Commanding the Troop of Horse Artillery, for two months each, and that their Reports be submitted at the expiration of that time.

ARTICLE 557.

On the Best Patterns of Platform for Guns and Mortars.

Letter No. 566, from the Secretary Military Board, to the Brigadier Commandant of Artillery, dated 8th February, 1850.

The Military Board having in view the making up of a considerable number of Gun and Mortar Platforms, I have the honor to convey a request that you will be good enough to assemble the Artillery Select Committee as early as practicable to report upon the forms, dimensions, and improvements, of Platforms which they would think most advisable to adopt, carefully reviewing the former proceedings of the Select Committee, and examining the different patterns of Platforms which have been under trial.

2. The Committee, after examining the various patterns of platforms and the reports on record, have come to the following decision.

3. Opinion.—That there should be four patterns of Platforms, two for Mortars, and two for Guns and Howitzers, as hereafter described.

1st. Bombay Mortar Traversing Platform for 8 Inch Mortars Bombay pattern, proposed[b] by Colonel Pearse in 1830, it consists of three sleepers and an upper frame; the front sleeper having a bolt passing through it from underneath, on which the frame is traversed.

(b) Meeting 51, Article 128.

2d. Mortar Platform for 13 and 10 Inch Mortars of Colonel Derville improved by Captain Oakes, introduced in 1847, consisting of 5 sleepers and 9 planks, each plank having

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three holes to admit of bolts passing through them; 3 long screw-bolts are fixed in each flank sleeper to pass through the front, centre, and rear, planks from underneath, proceeding upwards through two ribands which run from front to rear, and are secured with nuts on the upper surface of the ribands; six short bolts are also fixed in these sleepers to pass through the remaining planks as far as the upper surface. The centre sleeper has short screw bolts passing upwards through every plank, as far as its surface, which are secured with circular nuts screwed on them, the planks being countersunk to admit of their being flush with the planks.

3d. Madras traversing Platform improved by General Cullen, for 24, 18 and 12 Pounders in 1825,(c) consisting of 3 sleepers, 2 hurters, 1 centre or recoiling plank, 2 wheel planks, 2 cross planks, 1 pintrail, and 8 bolts with keys and washers.

(c) Meeting 14, Article 31.

4th. Gun Platform of Colonel Derville, improved by Captain Oakes, made of two of the Mortar Platforms above described., for Heavy Howitzers 10 and 8 inch.

ARTICLE 558.

ON AN IRON CARRIAGE FOR A 10 INCH HOWITZER, THE COMPONENT PARTS OF WHICH HAVE BEEN FURTHER REDUCED AS RECOMMENDED IN MEETING 155, ARTICLE 523.

	cwts.	qrs.	lbs.
The original weight of the Carriage was	30	3	0
The weight after being reduced the 1st time was	28	0	22
Its present weight after being reduced the 2nd time is	26	1	18

2. OPINION.—The carriage having been submitted to the usual proof of 15 rounds with the service charge, without sustaining injury, the Reports are laid before the Committee, by which it will be perceived that notwithstanding the great reduction in weight as above shown, the recoil is not increased, the result of the experiment is therefore very satisfactory.

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ARTICLE 559.

On Three Descriptions of Fuzes.

Letter No. 2288, from the Secretary Military Board, to the Brigadier Commandant of Artillery, dated 4th December, 1849.

I have the honor by order of the Military Board to request, you will obtain the opinion of the Select Committee of Artillery, upon the accompanying Brass Fuze, differing in one or two points from that formerly experimented upon. I am directed to request that you will cause a dozen to be made for experiment in the Artillery Depôt; and that you will favor me with your opinion as well as that of the Committee, as to whether a continuous slit, in the outer cylinder, might not be more sure of ignition, than the succession of holes of such small diameter, and whether the inner cylinder ought to be as in this closed, or open, to ensure the shells bursting, at least, when the composition is burnt out, if it does not do so sooner, and thus prevent the shells being used by the enemy.

Three different descriptions of Fuzes are submitted:

1st. Concussion Fuze by 2d Lieutenant Playfair, recommended to be made up.[a]

(a) Meeting 157, Article 536. Page 990.

2d. The same with Lead substituted for Copper as an experiment.

3d. A modification of Lieutenant Olphert's Metal Fuze.[b]

(b) Letter Military Board, No. 2288, 4th December, 1849.

2. The Reports upon the above Fuzes are laid before the Committee.

3. Opinion.—The Reports annexed marked No. 1, No. 2, and No. 3, on the experiments made with these fuzes show that they are not to be depended upon.

Report of Concussion Fuzes for Shells, by 2d Lieutenant R. L. Playfair.

No. 1.—*Trial on the 9th of February,* 1850.

Four of Lieutenant Playfair's Copper Fuzes were used with

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the 2d round—2 succeeded—2 failed. The failure was owing to the rivet, which held the metal on the side of the Fuze, giving way, on the concussion of firing; this was evident, as the bursting powder exploded after 11 and 13 seconds, respectively, and the wire which passed through the composition rivetting the metal was 2·2 inches from the cup.

2. Four fuzes similar to the above, substituting lead for copper, were used with the 3d round, the whole failed, the cause of failure was the same as that of the fuzes with copper, the bursting powder exploding at 12 seconds.

3. The whole of the fuzes were cut off at the bottom of the composition to ensure the shells bursting in the event of the concussion on striking the ground failing, the length of composition was 5 inches equal to 25 seconds time of burning.

No. 2.

Memorandum of Experiments with Lieutenant Playfair's Concussion Fuzes, on the 21st February, 1850.

Ordnance.	No. of Firings.	Charge.			Elevation.	Flight.		Fuse Started.		Distance.	Fuze fitted.	Remarks.
		lbs.	ozs.	drs.	D.	sec.	pts.	sec.	pts.	yards		
8 Inch Iron Mortar.	1	1	8	8	45	16	0	16	0	1141	With Lead.	Burst on striking the ground.
	2	0	0	0	0	15	0	12	0	1014		Burst in the air.
	3	0	0	0	0	15	0	15	0	1060		„ on striking the ground.
	4	0	0	0	0	16	0	13	30	1121		„ in the air.
	5	0	0	0	0	14	0	7	0	870		„ do.
	6	0	0	0	0	15	30	0	0	1100		Did not burst.
	1	1	8	8	45	15	30	15	30	1012	With Copper.	Burst on striking the ground.
	2	0	0	0	0	16	30	16	30	1116		„ do.
	3	0	0	0	0	15	30	15	30	1060		„ do.
	4	0	0	0	0	15	0	15	0	1000		„ do.
	5	0	0	0	0	15	30	15	30	1120		„ do.
	6	0	0	0	0	15	30	0	0	1112		Did not burst.

Artillery Depôt,
Saint Thomas' Mount,
22d February, 1850.

A. F. Oakes, Capt.
Director Artillery Depôt.

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No. 3.

Report on the Trial of a Brass Fuze (Olphert's modified) driven in the usual way; the holes in the inner Cylinder were cleaned out after driving—submitted to the Select Committee by the Military Board, in Letter No. 2288, dated 4th December, 1849.

Date.		Length to which set.		Time of burning.	
		ins.	ths.	sec.	pts.
20th, 21st, and 22d Feb. 1850.	1st Trial,	0	8	5	0
	2d „	0	8	5	0
	3d „	0	8	5	0
	4th „ Exploded,	0	8	4	0
	5th „	0	6	5	0
	6th „	0	6	5	0
	7th „	0	6	5	0
	8th „ Exploded,	0	8	4	0
	9th „	0	8	5	0
	10th „	0	4	5	0
	11th „ Exploded,	0	4	2	0
	12th „	0	4	5	0

Artillery Depôt, Saint Thomas' Mount, *25th February*, 1850.

A. F. Oakes, Captain, *Director Artillery Depôt.*

ARTICLE 560.

On a 12 Pounder Howitzer, and 9 Pounder Gun Carriages, built with Ooroopoo Wood.

Two Gun Carriages, one for a 12 Pounder Howitzer, the other for a 9 Pounder Gun, constructed of Ooroopoo wood in 1848, originally submitted to the Select Committee on the 18th April, 1848 [a]; they were subjected to an ordinary proof of 15 rounds, and have twice undergone the extraordinary proof of 90 rounds, viz., before and after the component parts were reduced. They were in use with the Horse Artillery and 2d Battalion for 6 months, and afterwards reported on, by the Artillery Select

[a] Meeting 146, Article 484, Page 701.

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Committee on the 27th June, 1849 (*); since then they have been 6 months longer in use with the Horse and Foot Artillery, viz., from September 1849, to February, 1850.

(*) Meeting 155, Article 524, Page 959.

		12 Pdr. How.			9 Pdr. Gun.		
Original weight, - -	cwt.	14	1	1	13	2	21
After being reduced, -	„	13	1	23	13	0	2
„ „ in use 6 months,	„	13	0	5	12	2	20
Present weight, - -	„	12	3	2	12	1	14

2. They are now submitted for report as to whether Ooroopoo wood can be used in the construction of Gun Carriages.

3. OPINION.—The cracks in the Carriages are so numerous as to show a decided defect in the wood, which the Committee do not consider to be suited for Artillery purposes.

Letter No. 1092, *from the Secretary Military Board, to the Brigadier Commandant of Artillery, dated* 15*th March,* 1850.

In acknowledging the receipt of Proceedings of the Permanent Artillery Select Committee, Meeting No. 159, Article 560, dated 28th ultimo, with your countersignature attached, communicating opinion that Ooroopoo wood has been found on trial unsuited for Artillery purposes, I am directed by the Military Board to inform you, that they have resolved that the Carriage already constructed of that wood be reserved for drill purposes.

ARTICLE 561.

ON ADAPTING A LIGHT CARRIAGE FOR A 9 POUNDER GUN WEIGHING CWTS. 8-3-21 FOR SERVICE PURPOSES FOR A HEAVY 9 POUNDER GUN WEIGHING CWT. 10-0-0 AND VICE VERSA.

Letter No. 92, *from the Superintendent Gun Carriage Manufactory, to the Secretary Military Board, dated* 11*th February,* 1850.

In reply to your Memorandum No. 465, of the 7th instant, I have the honor to state that the Carriage of a 9 Pounder

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Gun of about 8¾ cwt., can be made to fit the same piece of Ordnance of 10 cwt., by filing off the shoulders of the trunnion plates, and the Carriage of a 24 Pounder Howitzer of 8¾ cwt., is adapted for the same calibre of 10 cwt., as there is no difference in the two Howitzers except in the size of the base ring, but this does not affect the Carriage.

2. Opinion.—The slight difference in the dimensions of the shoulders of the trunnions might easily be adjusted by filing, but in consequence of the centre of the base ring of the heavy gun projecting so considerably over the centre of the capstan head of the Carriage of the lighter piece at low elevations, and of the centre of the base ring of the light gun falling short of the screw head of the Carriage of the heavier piece at high elevations, it is not considered expedient to attempt adapting the one for the other, nor do the Committee think it advisable to construct a semelle for that purpose.

Minute by Captain Maitland.

I see no objection to a semelle if one is required.

Letter No. 1175, *from the Secretary Military Board, to the Superintendent Gun Carriage Manufactory, dated Fort St. George,* 15*th March,* 1850.

In reference to your letter No. 92, of date 11th February, 1850, and Proceedings of Artillery Select Committee, Article 561, Meeting 159, (herewith enclosed to be returned,) I am desired by the Military Board to state that they deem it not only expedient, but highly necessary, to attempt to lessen the existing complication resulting from having in use two descriptions in weights and lengths of 9 Pounder Brass Guns and 24 Pounder Brass Howitzers with Carriages only suited to receive one particular piece of each calibre, and the Board therefore request you will carefully consider, and report the alterations to adapt a Carriage intended for a light 8¾ cwt. 9 Pounder Gun, and 24 Pounder Howitzer to receive a piece of these calibres of 10 cwt.

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The Board will request the Commandant of Artillery to send to the Manufactory from the Field Train and Batteries at the Mount, one light Carriage and light piece of each of these calibres, to assist you in deciding both alterations required.

The Board are fully alive to the risk of breaking down the light Carriages by putting on them heavier pieces, but the difficulty of keeping the out-Stations supplied with Carriages and Guns suited to each other is so great, that the Board deem it indispensable to endeavor to provide a remedy for evils, which the Select Committee must have overlooked, when they reported that it was " not expedient to attempt adapting the one to the other."

The Board consider the addition of a semelle on hinges and an alteration in the mode of suspending the elevating screw by means of a cradle, which shall embrace and not perforate the cheek, as trifling difficulties compared with those now occasioned by the existing complication, and should you deem these changes likely to answer, the Board will authorize the alteration of a Carriage of each calibre again to be submitted for the Report of the Select Committee.

The Board do not at present wish you to consider the mode of adapting the light piece to the heavy Carriage, until the above more important one is determined.

To

The Brigadier Commandant of Artillery (to be communicated to the Artillery Select Committee) with a request that the Commandant will be good enough to order to the Manufactory a 9 *Pounder Gun and Howitzer Carriage with their Light Pieces.*

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MEETING 160.

EXTRACT FROM THE PROCEEDINGS OF THE PERMANENT ARTILLERY SELECT COMMITTEE, ASSEMBLED BY ORDER OF COLONEL P. MONTGOMERIE, C. B., BRIGADIER COMMANDANT OF ARTILLERY.

Artillery Depôt, St. Thomas' Mount, 3d May, 1850.

Present.

LIEUT. COL. P. HAMOND, *Commanding 5th Battalion Artillery.*
LIEUT. COL. H. S. FOORD, *Commanding 4th Battalion Artillery.*
MAJOR P. J. BEGBIE, *5th Battalion Artillery.*
CAPTAIN T. LAVIE, *Superintendent Gunpowder Manufactory.*
CAPTAIN J. MAITLAND, *Superintendent Gun Carriage Manufactory.*
CAPTAIN A. F. OAKES, *Director Artillery Depôt.*
CAPTAIN B. W. BLACK, *Assistant Adjutant General of Artillery.*

ARTICLE 562.

DIAGRAMS OF MORTAR PRACTICE, &C., BY MAJOR J. W. CROGGAN, MADRAS ARTILLERY.

1st. On the velocities of Shot and Shells, with tables of velocities deduced from practice, with Diagrams; also,

2nd. On ranges and velocities with variable scales applicable to any pieces of Ordnance, showing the velocities of the projectile at any period of its flight; together with,

3rd. Diagrams of Spherical Case Shot practice giving at one view, the length of fuze for any particular range, (Plate 6.)

1. A general Abstract of these papers as submitted by Major Croggan on the 13th October, 1849, to the Commandant of Artillery, is laid before the Committee; as also the following references in the Madras Artillery Records under

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Practice and Experiments, pages 90, 92, 93, 99, 139, 193, 205, 208, 216, 221, 227, 362, 378, 379, 381, 391.

2. OPINION.—The Select Committee have already per the substance of these papers in the Artillery Records; bu the Diagrams are purely theoretical, and dependent for corr ness on a variety of circumstances, the Select Committee c sider that they do not fall within the province of their dut which are, to dispose of practical questions.

ARTICLE 563.

INSTRUMENT FOR TAKING DISTANCES, PROPOSED BY MAJOR J. CROGGAN, 2ND BATTALION ARTILLERY, WHICH MAY ALSO USED AS A CAMP SQUARE, AND FOR SUBTENDING ANGLES.

1. OPINION.—The Committee have already seen a descri tion of this Instrument in "Artillery Records" Practice an Experiments, page 362; they consider it to be a very ingen ous one, but it could not be made generally useful without tripod; as it is not desirable to multiply the articles carrie with a Battery, except upon grounds of acknowledged utility, the Committee do not recommend its adoption.

ARTICLE 564.

CARRIAGES FOR BRASS 3 POUNDER MOUNTAIN TRAIN GUN.

The Military Board[a] call for an opinion as to the superiority or otherwise of the Iron Carriage for the Brass 3 Pounder Mountain Train Gun over the Wooden Carriage, also for information as to the weights of each without wheels, and whether a lighter and better 3 Pounder Carriage might not be built, on higher wheels, and the use of a limber dispensed with.

(a) No. 921, 5th March, 1850.

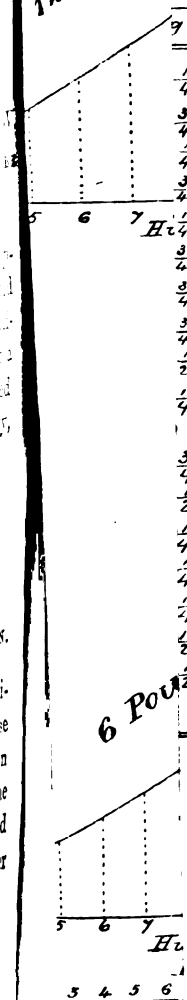
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ery Select Committee.
eeting 160, Article 562.
Spherical Case Shot Practice
W. Croggan, Madras Artillery.

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l Case Shot Practice Table.

4 Pdr. Howitzer.		12 Pdr. Howitzer.		9 Pdr Gun.		6 Pdr. Gun.	
Elev.ⁿ	Fuze	Elev.ⁿ	Fuze	Elev.ⁿ	Fuze	Elev.ⁿ	Fuze
g.	tenths	Deg.	tenths	Deg.	tenths	Deg.	ths.
1/4	.3	1 1/2	.3	1 1/4	.2 1/4	1 1/2	.2 1/2
3/4	.3 3/4	2	.4	1 1/2	.2 3/4	1 3/4	.3 1/4
1/4	.4 1/2	2 1/2	.4 3/4	1 3/4	.3 1/2	2	.4
3/4	.5 1/2	3	.6	2	.4 1/2	2 1/4	.4 3/4
1/4	.6 1/2	3 1/2	.7	2 1/4	.5 1/4	2 1/2	.5 1/2
3/4	.7 1/4	4	.8 1/4	2 3/4	.6 1/4	3	.6 1/2
3/4	.8 1/4	5	.9 1/4	3 1/4	.7 1/4	3 1/2	.7 1/2
3/4	.9 1/4	6	.10 1/2	3 3/4	.8 1/4	4 1/4	.8 1/2
1/2	10	7	11 3/4	4 1/4	.9 1/4	5	.9 1/2
1/4	11	8 1/4	13 1/4	5	10 1/4	5 3/4	10 3/4
	12	9	14 1/2	5 3/4	11 1/4	6 1/2	11 3/4
3/4	13 1/8	9 3/4	16	6 1/2	12 1/2	7 1/4	13
1/2	14 1/8	10 1/2	17 1/2	7 1/4	13 3/4	8 1/4	14 1/2
1/4	15 1/8	11 1/4	19 1/2	8	15 1/2	9	15 3/4
1/4	16 1/8	–	–	9	16 3/4	10 1/2	17 1/4
1/4	17 1/4	–	–	10	18 1/2	–	–
1/2	18 1/2	–	–	11	20	–	–
1/2	19 3/4	–	–	–	–	–	–



Signed /

J. W. Croggan, Major
Artillery.

C.B. lith.

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1. The Committee observe that the weights of the two following Carriages with and without the wheels, viz.:

	With the Wheels. cwts.	qrs.	lbs.	Without the Wheels. cwts.	qrs.	lbs.
Colonel Cullen's pattern Carriage for 3 Pounder Gun, - - - -	7	0	25	3	2	9
Major Anstruther's Iron Carriage for 3 Pounder Gun, - - - -	3	0	5	1	1	19

	cwts.	qrs.	lbs.	
Show the Iron Carriage to be	4	0	20	lighter than the wooden one.

2. Opinion.—In the opinion of the Committee there can be no question of the superiority of a light Iron Gun Carriage for Mountain Train purposes, where facility of transport is so great an object: the only advantage that the Wooden Carriage can be said to possess over the Iron one is, that the recoil of the former is very much less; the Iron Carriage when proved at P. B. recoiled 6 feet 9 inches; whereas, the wooden one only recoiled 1 foot 4 inches.

3. The Committee propose that they be allowed to prepare plans of a suitable pattern of a 3 Pounder Iron Carriage for Mountain Train purposes, with and without a limber for further consideration, at a future Meeting.

Letter No. 2477, from the Secretary Military Board, to the Brigadier Commandant of Artillery, dated 21st May, 1850.

With reference to para. 3 of extract from the Proceedings of the Artillery Select Committee in Meeting No. 160, Article 564, regarding Brass 3 Pounder Mountain Train Gun Carriages, I am directed by the Military Board to request you will have the goodness to cause Plans of a suitable 3 Pounder Iron Carriage to be prepared as therein proposed and submit the same to the Board at convenience.

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ARTICLE 565.

INSTRUMENT FOR LAYING MORTARS, PROPOSED BY 2ND LIEUT. H. D. GLOAG, DOING DUTY WITH THE 2ND BATTALION ARTILLERY. Plate 7.

Letter No. 97, from the Officer Commanding 2nd Battalion Artillery, to the Director Artillery Depôt, dated 8th March, 1850.

I have the honor to forward a plan of an instrument for laying Mortars with explanation attached, proposed by 2nd Lieut. H. D. Gloag, doing duty with the Battalion under my command, which I request you will be pleased to submit to the Brigadier Commandant of Artillery for his consideration.

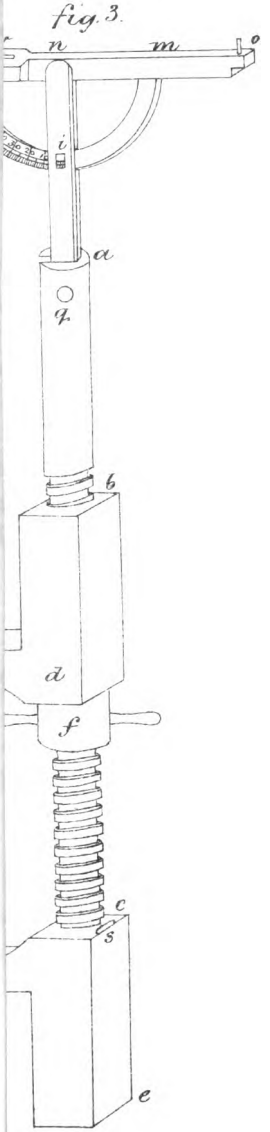
EXPLANATION.

Fig 1, *a b* is a piece of Metal one inch and a half square and 12 inches long, having a hole in it $\frac{3}{4}$ inch square and 10 inches in depth, into which there is a rod *r* fitting with a joint *n*, on which *y o* turns; in the part downwards from *n*, there is a groove *l*, into which *n o* fits, so that when *y n r* is brought into the same line, *y n r* may be pushed into *a b*: *p* is a graduated arc 4 inches in diameter connected to *y o* at *w* and *m*, of a thickness equal to the width of the groove *l*; this arc is used for elevating and has an index *i*, it is also useful for strengthening the joint *n*, and aiding to keep *y o* in its proper direction; in *a b* there is a groove *g*, of the same width as that in the rod *r* and 4 inches long, so that when *y n r* is in the same line and the rod *r* shut in, it enters the groove as seen at *g* fig. 2: *y o* is 8 inches long with a spirit level at *w*, let into it so as not to prevent the part in which it is from shutting into *a b*; *o* is a sight (with a notch on the top) which may be pushed down at pleasure, there is a notch at *y*, both of which are required in giving the direction; *s* is a spirit level for obtaining the centre and let into *a b* so as to be flush with the top, in order that when the rod is pushed down it may be protected as seen in fig. 2:

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Mortars,

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Madr

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b c is a male screw, about ½ an inch in diameter and 5 inches long fixed to the lower end of *a b*, and entering into *c d*, which is a male screw with a female screw cut in it, into which *c b* fits; in *d e* which is 6 inches long there is a female screw, into which *c d* fits, the threads on *c b* and *c d*, are equidistant; those on *c b* inclining upwards, those on *c d* downwards; let the handles on *c d* be turned from right to left, when *c d* will descend into the female screw in *d e*, it will also ascend on threads of the screw *c b*, and, as the distance between the threads on *c b* and *c d* is equal, *c d* will ascend the same distance on *c b* as it descends into *d e*, therefore *a b* and *d e* may be made to approach or sever as seen in Fig. 2 and Fig. 1; *h* and *k* are two feet (fixed to *a b* and *d e*) which enter the mortar, *h* on the upper service, *k* the lower, *x* and *z* being against the face of the mortar, *q* is a clamping screw.

Fig. 3 is another method.

a e is 18 inches long having a circular hole 14 inches deep bored in it, in which there is a sliding rod having a joint *n*, arc *p*, &c., similar to that in Fig. 1; *d* is 1½ inch square with a foot *h*, having a cylindrical hole drilled through it, and of sufficient diameter to allow it to move on the threads of the screw, *f* is a female screw, by turning which, *d* may be raised or permitted to descend; *c e* is 1½ inch square with a foot *k*; *s* is a spirit level let in *c e*; the rod *r* is shut in, similarly to *r* Fig. 1.

1. Opinion.—The ingenuity displayed by 2nd Lieutenant Gloag in the invention of this Instrument is very creditable to that Officer. The Committee would recommend that the Instrument be made up at the Artillery Depôt, and, after being tested at Practice, that it be again laid before them for their report.

Letter No. 2420, from the Secretary Military Board, to the Brigadier Commandant of Artillery, dated 21st May, 1850.

Of date 3d May, 1850. Having submitted to the Military Board, Artillery Select Committee's Pro-

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ceedings, Meeting 160, Article 565, on an Instrument for laying Mortars proposed by 2nd Lieutenant Gloag.

I am directed to convey their approval of having this Instrument made up at the Artillery Depôt, and submitted for trial and subsequent report of the Artillery Select Committee.

ARTICLE 566.

On the efficiency and utility of a Square Gyn made up as recommended by the Artillery Select Committee, in Meeting 155, Article 525.

In Letter No. 1067, from the Secretary Military Board, to the Brigadier Commandant of Artillery, dated 13th March, 1850. The Military Board with reference to Extract from the Proceedings of the Permanent Artillery Select Committee, Meeting No. 155, Article 525, dated 27th June last, direct that the Square Gyn therein alluded to may be submitted to the Artillery Select Committee, and a report of their opinion on its efficiency and utility, again transmitted to the Board.

1. The following Table exhibits the weight and dimensions of the ordinary Artillery Gyn, and of the Square Gyn now submitted to the Committee.

	Artillery Gyn.			Square Gyn.		
	Ft.	Ins.	ths.	Ft.	Ins.	ths.
Length of Cheeks,	17	8	0	20	0	0
Diameter of Cheeks,	0	6	0	0	6	4
Do. at large end of Windlass,	1	0	0	0	11	6
Do. at small end of do.	0	7	5	0	7	6
Length of Windlass,	8	0	0	8	0	0
	cwt.	qrs.	lbs	cwt.	qrs.	lbs.
Weight,	11	0	27	22	2	22
Weight of the 32 Pdr. Iron Gun and Carriage,	78	2	0	78	2	0

2. A 32 Pounder on its Carriage, total weight 78 cwt. was raised, in presence of the Committee, with the double Gyn, the handspikes of both windlasses being double manned by 8 Gun Lascars; the same was tried with the single Gyn, the handspikes of its single windlass being double manned by 4 men: with the double Gyn the weight was raised with ease; with the single Gyn the Gun Lascars failed to move it off the

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ground; when the same number of Europeans, however, were substituted for the Gun Lascars at the single Gyn, they raised the weight at once.

3. Opinion.—In the opinion of the Committee, the single Gyn is sufficient for all ordinary work in Arsenals; the double Gyn would no doubt be found useful with very heavy Ordnance, such as 56 Pounders: as double the power can be applied with it, from its having two sets of tackles capable of being simultaneously worked by double manning the handspikes of both windlasses; but it is altogether too heavy for transport, and only fit for use in a large Arsenal, such as that of Fort Saint George, where the Committee would recommend its being kept.

4. Serjeant Power of the Effective Supernumeraries, attached to the Garrison of Fort Saint George, is, in the opinion of the Committee, deserving of great credit, for having invented this double Gyn; and, should the Commandant of Artillery approve, they beg to submit Serjeant Power's name for the favorable notice of the Military Board.

Extract from letter No. 2424, from the Secretary Military Board, to the Brigadier Commandant of Artillery, dated 21st May, 1850.

"The Military Board request that the Square Gyn may be "forwarded to the Arsenal Fort St. George."

ARTICLE 567.

Proposed method of Fixing Dispart Sights to Light Field Ordnance, by 3rd Class Foreman Chalk.

The Military Board forward a letter [a] for submission to the Select Committee, containing suggestions for the more securely fixing of Dispart Sights, accompanied by a model showing two methods proposed by 3rd Class Foreman Chalk.

(a) No. 97. Comy. Ord. Bangalore, 28th Feb. 1850.

1. Opinion.—The plan now followed in all Arsenals of fixing Dispart Sights seems to answer the object so perfectly,

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that the Committee cannot recommend the adoption of any other mode; but, Foreman Chalk's contrivance of a small square piece of iron being fitted in the Gun and Dispart, and kept there by a spiral spring let into the latter, is an extremely ingenious one, and well worthy of being placed on record, as an invention likely to be turned to account hereafter.

ARTICLE 568.

On the Pattern of Carts for Light Field Batteries.

The Military Board wish to be informed [a] whether the Select Committee have fully agreed as to the pattern of Carts for Light Field Batteries.

(a) No. 1121, 15th March, 1850. Vide page 2.

1. A Report from Lieutenant Colonel Conran, Commanding Horse Brigade is laid before the Committee, complaining of the weight of the Artificers' Cart with tilt, during the recent march of a Troop of Horse Artillery from Kamptee to Bangalore.

2. The Committee observe that the Artificers' Cart at present in use with a tilt (of the Bengal pattern) weighs cwts. 13-0-18, and the weight of its allotment does not exceed cwts. 7-0-20.

The Store Cart without tilt may be reckoned at cwts. 12-1-7; its allotment is cwts. 8-1-11.

The Quarter Master's Cart of the same pattern as the Store Cart carries less weight than the Store Cart.

The Platform Cart of the Madras pattern weighs cwts. 6-0-0, and carries as its maximum 12 cwt.

3. Opinion.—The Committee have no hesitation in pronouncing the present patterns of Carts attached to Light Field Batteries very much too heavy, and they would recommend a considerable reduction in the following component parts:

Axletree and case—wheels—rear centre framing.

The wheel of the present platform Cart which only weighs lbs. 179 might be safely taken as the pattern for all Light

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Field Carts, viz., for Artificers, Store, Quarter Master's, and Forge—no great expense would be incurred by this arrangement, as the wheels of all the carts, in present use, will fit the axles of the Gun Carriages, both having brass naves and similar axles.

4. The Committee would recommend an old Artificers' cart being reduced in its component parts, and, after being altered as above referred to, that it be submitted for a further report.

5. The Committee consider, that if all the wheels of the carts above named be hereafter made of the present platform cart pattern, and thus be transferable from one to another, a great improvement will be introduced.

6. There is one point, regarding which the Committee wish to have further instructions, viz. :—whether the Artificers' cart is to have a splinter bar attached to it or not, as in the original drawings sent to them Nos. 24 and 25 received from Bengal; these carts have no splinter bars.

REMARK BY THE BRIGADIER COMMANDANT OF ARTILLERY.

I recommend a splinter bar to be added.

Letter No. 2556, from the Secretary Military Board, to the Brigadier Commandant of Artillery, dated 21st May, 1850.

I am desired by the Military Board, to state that they are prepared to sanction the experimental alteration of an old Artificers' cart, by reducing its component parts, as recommended by the Artillery Select Committee in Para. 4, of Article 568, of Meeting 160, whose proceedings will be transmitted to the Superintendent Gun Carriage Manufactory to guide him in making the alterations, but the Board consider, that the Committee should afford more specific details of the nature and description of cart they wish to introduce into the service.

The Board although willing to allow any experiments to be tried are not inclined to permit any extensive changes in the existing patterns of the Store, Forge, Artificers' and Quarter

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Master's Carts or Waggons, until the alterations have been fully tested and proved to be advantageous, on account of the great expenses already incurred in the construction of the established carts and waggons, of which, 62 have been built at a cost of Rupees 34,721-6-4 and which are now pronounced by the Select Committee to be "very much too heavy," in which opinion the Board regret to say they entirely concur.

From the Reports of the Select Committee and those of other Officers, particularly Colonel Conran, the Board are satisfied that it has never been distinctly understood for what purposes these Carts* and Waggons are intended,† and before proceeding further the Board think it advisable, that the various articles to be carried should be clearly defined, the weights of the articles ascertained, and the suitableness of the patterns of the articles determined; since, in a recent report, Lieutenant Colonel Conran expresses great doubt as to the necessity of having the large and heavy Forge Bellows, for which a substitute might be found in the largest kind of country Bellows.

* Quarter Master's Cart abolished in Bengal, vide G. O. G. G. will be sent hereafter.

† Vide letter No. 340, of 8th May 1850, from Lieut. Col. Conran to the Director Artillery Depôt.

The Board suggest for your consideration the expediency of collecting from the Records at the Artillery Depôt, all the information connected with these Carts or Waggons, to be printed or lithographed with drawings in illustration, and circulated to Artillery and Ordnance Officers, in order to elicit their opinions, and better enable the Select Committee to arrive at some satisfactory conclusion, before entailing on Government any further expenses in the construction of new Carts, which may again be found unsuitable.

The Superintendent of the Gun Carriage Manufactory will be furnished with a copy of this letter, to enable him to afford all the details of the weights and dimensions of the component parts of the Carts and Waggons already constructed, which, with this letter, will be included in the Papers ordered to be compiled.

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ARTICLE 569.

ON THE PRACTICABILITY OF REPLACING ALL THE DIFFERENT ELEVATING SCREWS NOW IN USE BY THE THREE NEW ESTABLISHED PATTERNS.

The Military Board with reference to Meeting 159, Article 553, call [a] for an opinion as to whether it is practicable to replace all the different Elevating Screws now in use, seventeen in number, by those of the three now established patterns.

[a] No. 1120, 15th March, 1850, vide page 19.

Extract from Letter No. 179, *from the Superintendent Gun Carriage Manufactory, to the Secretary Military Board, dated 22d March,* 1850.

"I have the honor to acknowledge your letter No. 1120, "of the 15th Instant, accompanied by an extract from the "Proceedings of the Artillery Select Committee herewith "returned.

"If the three screws alluded to in the Proceedings of the "Committee are introduced into the Service in place of all "the existing patterns, it will be necessary to have new "screws made for every carriage and bed according to the "proposed pattern screws, also, new screw-boxes, but of "different shapes; for all the cheek pattern Light Field Car- "riages have their boxes fitted on to the transoms horizon- "tally, the Artillery Select Committee's Carriage has the "flange of the box suited to the inclination of the trail."

1. OPINION.—The Select Committee find that the new Elevating Screws cannot be applied to the old pattern Carriages, but recommend them to be adopted for all new ones.

ARTICLE 570.

ON FIVE AMMUNITION CARTS WITH WOODEN NAVES ALTERED INTO LIGHT MORTAR CARTS.

In Letter No. 1286, from the Secretary Military Board, to the Brigadier Commandant of Artillery, dated 27th March,

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1850, it is directed that the five Ammunition Carts with wooden naves altered into Light Mortar Carts may be submitted to the Artillery Select Committee for report.

	cwt.	qrs.	lbs.
Weight of a Light Mortar Cart established pattern, -	11	0	7
Weight of the altered Ammunition Cart to a Light Mortar Cart, - - - - - - - - - -	8	3	10
Difference	2	0	25

1. OPINION.—An 8 Inch Mortar with its bed was lashed on in presence of the Committee to the altered Ammunition Cart, and it seemed to be abundantly strong enough.

2. The weight now allowed for a Light Mortar Cart weighing cwt. 11-0-7 is an 8 Inch Mortar and its bed, or two 5½ Inch Mortars and their beds.

3. The Committee recommend that an opportunity be taken for sending this altered Cart to an out-Station, carrying the same weight with the allotment of cattle now given for the ordinary Light Mortar Cart, by way of experiment.

In Letter No. 2434, from the Secretary Military Board, to the Brigadier Commandant of Artillery, dated 21st May, 1850, it is stated that the Principal Commissary of Ordnance has been requested to send one of the altered carts with the first Mortar (8 inch or 5½ inch) that there may be occasion to send up Country, and that the result of the trial will be communicated.

ARTICLE 571.

TWO 12 PDR. HOWITZERS, THE DEFECTS IN WHICH HAVE BEEN REMOVED AS RECOMMENDED IN MEETING 157, ARTICLE 539.

Letter No. 361, *from Lieutenant Colonel F. F. Whinyates, Principal Commissary of Ordnance, to the Director Artillery Depôt, St. Thomas' Mount, dated 27th March,* 1850.

I have the honor with reference to letter from the Military Board to the address of the Brigadier Commandant of Ar-

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tillery, No. 1795, under date 5th October, 1849, to state that the two 12 Pounder Howitzers therein alluded to, have had the rough edges of the metal which protrude in the bore of these pieces removed and they are now ready for removal to the Mount for the inspection and further report of the Artillery Select Committee.

Require re-bouching.

1. OPINION.—The two 12 Pounder Howitzers appear to be perfectly serviceable.

MEMO.—The above two 12 Pounder Howitzers were proved and reported perfectly serviceable by the Brigadier Commandant of Artillery on the 10th of June 1850.

ARTICLE 572.

ON CERTAIN ALTERATIONS AND REPAIRS EXECUTED TO FIVE SPECIAL BOARD PATTERN LIMBERS OF THE D TROOP H. A.

Letter No. 1397, *from the Secretary Military Board, to the Brigadier Commandant of Artillery, dated 2nd April,* 1850.

The Superintendent Gun Carriage Manufactory having reported the completion of the repairs required to be made to the Special Board Pattern Limbers of the D Troop Horse Artillery, I have the honor by desire of the Military Board to forward original Statement thereof (to be returned) and to request you will have the goodness to provide cattle for their conveyance to the Mount, that they may be submitted to the Artillery Select Committee for report, and if the alterations and repairs are found unobjectionable, I am directed to request the Limbers may be returned to the Arsenal for transmission to Bangalore.

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Statement of Alterations and Repairs executed to the following Limbers by order of the Military Board, No. 1399, *dated* 14*th August*, 1849, *and No.* 2324, *dated* 8*th December*, 1849.

No.	Description of Limbers with their Numbers.	Particulars of Alterations and repairs executed.
	ALTERED.	
1	Limber Light Field Howr. 12 Pdr. S. B. P. No. 4	
1	,, ,, Gun 6 ,, ,, ,, 6	Fitted up with new short Poles, pintle hooks, and axle-tree centre bands of the A. S. C. P. and painted.
1	,, ,, ,, 6 ,, ,, ,, 7	
1	,, ,, ,, 6 ,, ,, ,, 8	
1	,, ,, ,, 6 ,, ,, ,, 10	
	REPAIRED.	
1	Limber Light Field Howr. 12 Pdr. S. B. P. No. 4	2 Braces, 1 foot board and 3 brackets renewed, wheels re-tired and painted.
1	,, ,, Gun 6 ,, ,, ,, No. 6	2 Braces, 1 foot board, 3 brackets and 2 bottom, 2 end and 1 side board of 2 limber boxes renewed, wheels re-tired and painted.
1	,, ,, ,, 6 ,, ,, ,, No. 7	2 Braces, 1 foot board, 3 brackets, 1 limber box, 1 end board of a limber box, 1 bottom board of a store box, and one felloe renewed, wheels re-tired and painted.
1	,, ,, ,, 6 ,, ,, ,, No. 8	2 Braces, 1 foot board, 3 brackets, 2 side, 2 end and 1 bottom board of 2 limber boxes renewed, and wheels re-tired and painted.
1	,, ,, ,, 6 ,, ,, ,, No. 10	2 Braces, 2 foot boards, 3 brackets, 1 bottom board of a store box, and 2 bottom boards of a limber box renewed, and wheels re-tired and painted.

(Signed) J. MAITLAND, Captain,
Supt. Gun Carriage Manufactory.

GUN CARRIAGE MANUFACTORY, MADRAS, 5*th March*, 1850.

1. OPINION.—The alterations and repairs are unobjectionable, provided that the limbering loops of the Special Board pattern Gun Carriages, which belong to these Limbers, be altered to fit the hooks which are now on the limbers (of the Select Committee Pattern.)

Letter No. 2411, *from the Secretary Military Board, to the Brigadier Commandant of Artillery, dated* 21*st May*, 1850.

In reference to the Proceedings of the Artillery Select Committee, Meeting 160, Article 572, of date 3d May, 1850, on alterations made in certain Limbers of the Special Board pattern, I am directed by the Military Board to inform you that the Gun Carriages belonging to these Limbers will have the necessary alterations made to their limbering loops on their arrival from Bangalore.

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MEETING 161.

EXTRACT FROM THE PROCEEDINGS OF THE PERMANENT ARTILLERY SELECT COMMITTEE, ASSEMBLED BY ORDER OF COLONEL P. MONTGOMERIE, C. B., BRIGADIER COMMANDANT OF ARTILLERY.

Artillery Depôt, Saint Thomas' Mount, 26th June, 1850.

Present.

LIEUT. COL. P. HAMOND, *Commanding 5th Battalion Artillery.*
LIEUT. COL. H. S. FOORD, *Commanding 4th Battalion Artillery.*
CAPTAIN T. LAVIE, *Superintendent Gunpowder Manufactory.*
CAPTAIN J. MAITLAND, *Superintendent Gun Carriage Manufactory.*
CAPTAIN A. F. OAKES, *Director Artillery Depôt.*
CAPTAIN B. W. BLACK, *Assistant Adjutant General of Artillery.*

ARTICLE 573.

Wrought Iron Carriages for 5½ Inch Brass Mortars. Plates 8 to 17.

Adverting to the following opinion recorded by the Select Committee in a former Meeting[a] in February last, viz., "The Committee recommend that all the three Carriages[b] may undergo such alterations and modifications as the Officers who submitted them may think fit to make, before they are again brought before the Committee for final report." The above recommendation having been sanctioned by the Military Board, the three Officers alluded to, having taken advantage of the permission granted to them, and the three Carriages having undergone Proof, the original question is again laid before the Committee for decision, together with the following documents:

(a) Meeting 159, Article 551. Page 6.

(b) Referring to the 5½ Inch Mortar Carriages which
Capt. Oakes submitted 26th Nov. 1849.
Maj. Anstruther „ 29th „ „
Capt. Maitland „ 5th Dec. „

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Report of a Proof of the undermentioned Carriage and Beds for 5½ Inch ... mandant of Artillery.

DESCRIPTION.	No. of Carriages or Beds.	No. of Firings.	Nature and strength of Powder.	Marks on the Ordnance.	Marks on the Carriages or Beds.	Weight of Metal. cwts.	Metal. qrs.	Metal. lbs.	Carriage or Bed. cwts.	Carriage or Bed. qrs.	Carriage or Bed. lbs.	Charge. ozs.	Charge. drs.
Major P. Anstruther's Experimental Iron Mortar Bed for 5⅝ Inch Brass Mortar § with Platform ‡.	1	5 5 5 5	Madras October 1849, M. P. Pit, pressed and glazed. T. L. Superintendent 8 inch Mortar P. R. 720 yards.	G. Hutchinson, Fort William, 25 1833. No. 84.	J. M. 1850 No. 1.	1	2	25	0	3	24	6 6 6 6	0 0 0 10
Captain J. Maitland's Experimental Iron Mortar Bed for 5½ Inch Brass Mortar§ with Platform‡.	1	5 5 5 5		G. Hutchinson, Fort William. 16 1833. No. 73.	J. M. 1850 No. 1.	1	2	23	0	2	10	6 6 6 6	0 0 0 10
Captain A. F. Oakes' Experimental Iron Carriage for 5½ Inch Brass Mortar.	1	5 5 5 5		G. Hutchinson, Fort William, 18 1833. No. 75.	A. F. O. 1850 No. 1.	1	2	23	1	3	4	6 6 6 6	0 0 0 10

§ The elevating screw box end of the cheeks is the front, the rear transom the rear of these beds.
‡ These Platforms were not used during the firing, the wheels belonging to them sustained the followin... at the tire—one spoke at the junction at the nave box.

ARTILLERY DEPOT,
Saint Thomas' Mount,
14*th June*, 1850.

(Signed) P. MONTGOMERIE, Bri...
Commandant ...

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ass Mortars, by order of Colonel P. Montgomerie, C. B., Brigadier Com-

Elevation. D.	Elevation. M.	Recoil. ft.	Recoil. ins.	Time in Firing.	REMARKS.	Inch.	
					Right cheek bent upwards out of the horizontal line in rear,.....	$\frac{3}{16}$*	* Done at 60° elevation.
6	0	12	0		Do. do. do. in front,.....	$\frac{1}{20}$†	† Done when Firing at low elevations.
11	0	11	0		Left cheek do. in rear,.....	$\frac{3}{8}$*	
16	0	9	0		Do. do. do. in front,.....	$\frac{1}{20}$†	‡ Weight of Platform 3 qrs. 12lbs.
60	0	0	0		The rear transom bolt bent upwards,.....	$\frac{1}{2}$	
					The ends of the rear of the cheeks drawn in,	$\frac{1}{80}$	
						Inch.	
					Right cheek bent upwards out of the horizontal line in rear,.....	$1\frac{1}{4}$*	* Done at 60° elevation.
					Do. do. in front,.....	$\frac{3}{10}$†	† Done when Firing at low elevations.
6	0	12	0		Left cheek do. in rear,.....	$1\frac{1}{4}$*	
11	0	11	0		Do. do. in front,.....	$\frac{3}{8}$†	
16	0	10	0	2 Hours.	Right cheek cracked on its under surface in rear of a perpendicular line dropped from the centre of the trunnion hole,.....	$2\frac{3}{4}$*	‡ Weight of Platform 3 qrs. 13lbs.
60	0	0	0		Left cheek do. do. do....	$8\frac{1}{2}$*	
					Do. bent inwards at the fracture,....	$\frac{1}{4}$	
					The rear transom bolt bent downwards,....	$\frac{1}{70}$	
6	0	16	0				
11	0	12	0		The Carriage and Bed stood the Proof uninjured.		
16	0	10	0				
60	0	0	0				

njury in conveying the beds with pieces from Madras to the Mount. Two spokes broke at the junction

adier,
Artillery.

(Signed) A. F. OAKES, Captain,
Director Artillery Depôt.

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Letter No. 2155, from the Secretary Military Board, to the Brigadier Commandant of Artillery, dated 10th May, 1850.

The Superintendent of the Gun Carriage Manufactory having in his letter to your address No. 270, of 8th May, 1850, reported the completion of the alterations to Captain Oakes' Iron Carriage for a 5½ Inch Mortar, I am desired by the Military Board to request you will assemble the Permanent Artillery Select Committee as early as convenient, with a view to the Carriage being fully tested in any way the Committee may think advisable, and, after carrying out such experimental firings with the piece from the Carriage with and without its wheels, they will draw up their Report upon its fitness for general or particular service, and, if only the latter, for what description of service, and the advisability of introducing this Carriage and Mortar into the service for which it is proposed by Captain Oakes.

2. The Board are of opinion that Captain Oakes should draw up and submit to you a Memorandum of the service for which the Carriage with Mortar is applicable, and the particular advantages to be expected from their use, and, if you see fit, that you should lay this Memorandum before the Committee.

3. The Board also request that you will favor them with your own views, when the proceedings are sent in.

Memorandum from the Director Artillery Depôt, to the Brigadier Commandant of Artillery, dated 18th June, 1850.

In accordance with your instructions I have the honor to submit this Memorandum showing 1st. The particular service for which I would recommend my wrought iron Carriage for a 5⅓ Inch Mortar to be adapted, and 2d. The advantages likely to result from its introduction into the service.

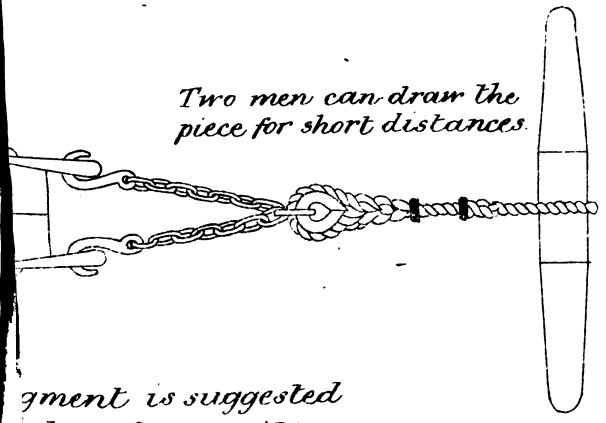
2. This Carriage was originally intended by me only for Mountain Train purposes, to be used on wheels at very low elevations, from 6° to 16° or thereabouts; and as a Mortar

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e

ch Brass Mortar in Plan.

l as a Mortar Bed



gment is suggested
ds of Ammunition

	Rounds
& Carriage complete, Boxes	6
carrying 8 Boxes	96
Total with each piece	102

C.B.

2 feet

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Plate 9.

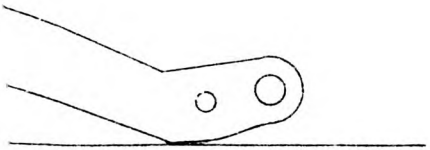
ittee

for a 5½ Inch Brass Mortar
zer for firing at low Eleva -
Mortar Bed.

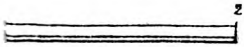
Cwt.	qrs.	lbs.
1	3	4
1	2	23
3	1	27

PRACTICE TABLE WHEN USED AS A HOWITZER.

Charges		Elevation	Distance
Ozs.	Drs.	Deg.	Yds.
6	"	6	285
"	"	11	503
"	"	16	680



C.B.



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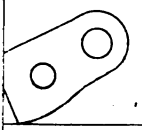
r 5½ Inch Brass Mortar
Mortar for firing at 45°

lbs

Cwt. qrs. lbs:
1. 0. 24
1. 2. 23
2. 3. 19

PRACTICE TABLE WHEN USED AS A MORTAR.

Charge		Elevation	Distance
Ozs.	Drs.	Deg.	Yds.
2	2	45	300
2	9	"	350
3	.	"	400
3	7	"	450
3	14	"	500
4	4	"	550
4	10	"	600
5	.	"	650
5	6	"	700
5	12	"	750
6	2	"	800
6	7	"	850
6	12	"	900
7	1	"	950
7	6	"	1000



C.B.

feet.

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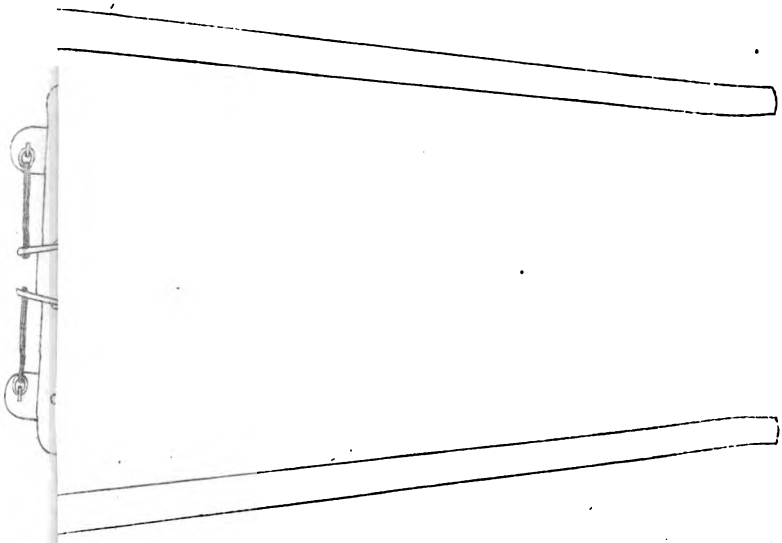
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Plate 11.

A. F. Oakes,

oses.

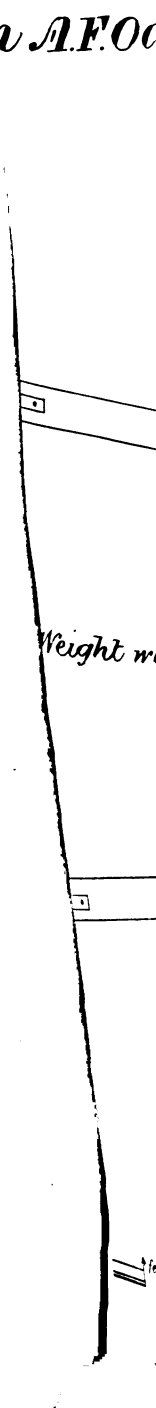


Mac

C. B.

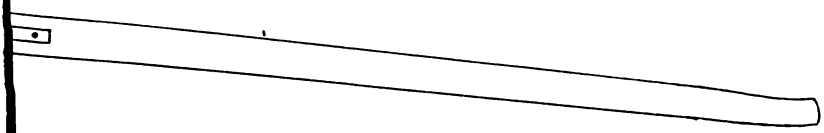
3 feet

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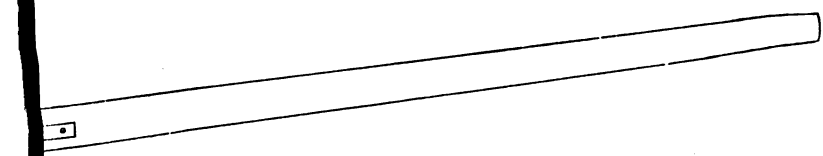
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n A.F.Oakes



Cwt. Qrs. lbs

Weight without Boxes.— 3 . 1 . 23



C.B.

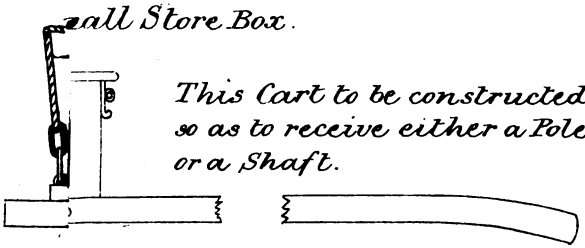
feet

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A.F. Oakes,

mmunition Boxes, holding 3 rounds
all Store Box.



This Cart to be constructed so as to receive either a Pole or a Shaft.

eight of each Ammunition Box
equently a Bullock can carry 2
ase, one on each side of him.

Ma C.B.

eet.

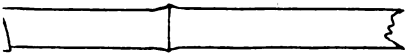
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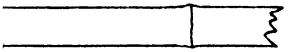
5½ Inch Brass Mortar,

are carried.



)

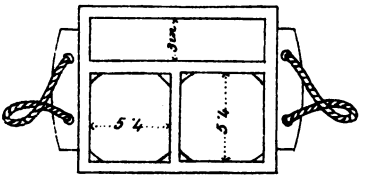
lbs
34 per Man.



An



Interior view of Ammunition Box.



h

Car
2

Net

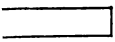
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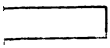
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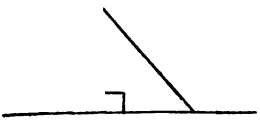
Plate 16.

7" Mortar





The dotted lines represent the Mortar reversed when used as a Howitzer.



Madras Art.ᵉ Dᵖ

C.B.

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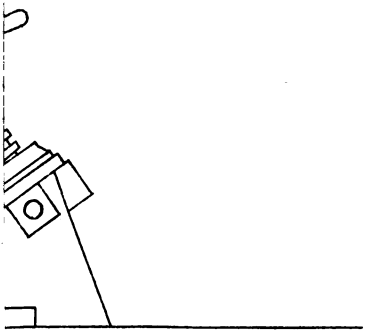
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W Mortar

e Manuy.



The dotted lines represent the Mortar reversed when used as a Howitzer.



Madr ot.

C.B.

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Bed at higher elevations; in both cases, the Mortar being fired over the Trail.

3. Finding, however, on the first experiment I made, that it answered all my expectations, I then turned my attention to adapting it to general Artillery service, as well as to Mountain Train purposes, and from the results, I would confidently recommend its adoption in supersession of the 5½ Inch Mortar Bed of the present established patterns, on account of its being so very much lighter, consequently more portable, also stronger; and from its being made of wrought Iron, more durable; the Carriage and Bed having stood the severest proof, there appears to me to be no question as to its introduction into the service being attended with greater efficiency; for Mountain Train Service, its advantages will be very great; the weights of the present established patterns which have stood proof, with those of the component parts of my Carriage and Bed, are as follows:

	Cwts.	qrs.	lbs.
The old Heavy Wooden Bed,	5	1	14
Mr. Harman's Iron Bed,	2	1	15
Mr. Thompson's Wooden Bed,	2	1	5

The weight of Captain Oakes' Carriage is as follows:

	Cwts.	qrs.	lbs.
Carriage without Wheels,	1	0	24
Wheels each 32 lbs.,	0	2	8
	1	3	4

Two men can draw it with the Mortar on with ease, for short distances, and when taken to pieces the following number of men are required:

4 men can	"double quick" with	the Body.
2 „	„ „	Wheels.
2 „	„ „	Ammunition Box containing 4 rounds.
6 „	„ „	Mortar.
Total 14	Men.	

	Cwts.	qrs.	lbs.
The weight of the Mortar is,	1	2	23

By the above it will be seen that the men carrying the body have an average of 34 lbs. each to carry; those carrying the metal and the wheels have 32 lbs. each.

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4. I would recommend 6 ounces as the Service charge for the 5½ inch when on the wheeled Carriage, which at

6° will give a range of 285 yards.
11° „ „ „ 500 „
16° „ „ „ 650 „

5. As a Mortar Bed, the wheels being taken off, it may be used with the heaviest charges. It has been found perfectly steady under fire with a charge of 8 ozs. 8 drs. giving a range of upwards of 1,400 yards at 45° elevation.

6. The great advantage of having wheels to the Carriage, when firing at low elevations is apparent, by the ease with which the Mortar is loaded, laid, and elevated. With wooden beds, to obtain these low elevations, it is necessary, with the view of preventing the risk of fracturing them in rear of the trunnion holes, to prop up the rear of the bed, or to cut a slope of about 30° in the ground to admit of the bed being lowered in the front; but the nature of the ground will not at all times admit of this, and it is always very laborious and inconvenient to the men to load and elevate the piece from the latter position, which labor will have to be repeated as often as a change of position of the Battery may be ordered, and which in Mountain Train Service might be of frequent occurrence.

7. Three wooden Beds in use with the 2d Battalion Artillery in April, 1849, were broken, when firing at low elevations; and I do not think that a single 5½ inch Bed of the present established pattern, would stand the proof which this Carriage has undergone at the low elevations of 6°, 11° and 16° with a charge of 6 ounces.

8. The accompanying drawings (Plates 11 to 15) with explanation will show, how I propose to carry the Carriage with its ammunition, stores, &c., when it may be required for Mountain Train purposes; on ordinary marching with a Siege Train, 4 of my Carriages complete might be carried on a common Platform Cart.

Opinion.—1. Captains Maitland and Oakes having withdrawn (with reference to Para. 6 of G. O. G. No. 140, 23d

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June, 1846,) the Committee proceed to consider the subject of the three 5¼ inch Carriages and Beds, in continuation of their Meeting 159, Article 551.

2. The three Carriages have now been before the Committee at Proof, and they consider that Captain Oakes' has shown satisfactory results, and is suited for general purposes, as well as for transport on mountain service.

3. The Carriages of Major Anstruther and Captain Maitland have failed in proof, owing, the Committee consider, to their dimensions being reduced too much.

MINUTE.

As the Committee have decided upon the 5½ inch Mortar and 4⅘ inch Howitzer for Mountain Train purposes, I see no object in retaining the 3 Pounder Gun. If retained merely for the purpose of firing canister, I am of opinion, that the 4⅘ inch Howitzer would answer equally well for that purpose.

(Signed) H. S. FOORD, Lieut. Colonel, *Artillery.*

„ J. MAITLAND, Captain.

ST. THOMAS' MOUNT, 26*th June*, 1850.

ARTICLE 574.

ON THE DESCRIPTION OF CARRIAGES BEST ADAPTED FOR THE 3 POUNDER AND 4⅘ INCH HOWITZER.

(a) Meeting 158, Article 452.
(b) Meeting 160, Article 564.

In continuation of the subject submitted to the Committee on the 7th December, 1849,(a) and on the 3d May, 1850, (b) the accompanying Plans of Carriages are submitted for consideration.

Nature of Carriage.	By whom submitted.
3 Pdr. Carriage.....	Captain A. F. Oakes.
4⅘ inch Howitzer Carriage.	Captain A. F. Oakes.

The following documents are laid before the Committee.

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Report of a Proof of the undermentioned Light Field Carriage, by order of Colonel P. Montgomerie, C. B., Brigadier Commandant of Artillery.

DESCRIPTION.	No. of Carriages.	No. of Firings.	Nature and Strength of Powder.	Marks on the Ordnance.	Marks on the Carriage.	Weight of Metal. cwt.	Metal. qrs.	Metal. lbs.	Carriage. cwt.	Carriage. qrs.	Carriage. lbs.	Charge. ozs.	Charge. drs.	Shot. lbs.	Shot. ozs.	Elevation. D.	Elevation. M.	Recoil. Feet.	Recoil. Ins.	Time in Firing.	REMARKS.
Carriage, Iron, for Brass 3 Pounder Gun, constructed in China by Major Anstruther, C. B. The Gun was reversed and fired over the trail of the Carriage.	1	1	M. P. Madras, June, 1849. Proof range 723 yards.	W. Kinman, 1781.	None.	2	0	0	3	0	5	12	0	3	0	P	B	15	0	One hour.	
		2														0	0	11	0		
		3														0	0	10	0		
		4														0	0	4	0		The Recoil was checked by means of a rope with 4 returns passed from wheel to wheel resting on the chase of the gun. On the wheels revolving, the check was effected by the rope coming in contact with the vent field of the gun.
		5														0	0	5	6		
		6														6	30	5	0		
		7														0	0	5	6		
		8														0	0	4	0		
		9														0	0	5	0		A rope was passed from wheel to wheel with 2 returns.
		10														0	0	5	0		
		11														13	0	11	0		The rope was taken off.
		12														0	0	4	6		The rope was again put on with two returns. When the Recoil was checked, the trail of the carriage rose until the breech of the gun came in contact with the ground.
		13														0	0	5	6		
		14														0	0	5	6		
		15														0	0	5	6		

No injury was sustained by the Proof.

ARTILLERY DEPOT,
Saint Thomas' Mount,
6th *May*, 1850.

(Signed) P. MONTGOMERIE, Brigadier,
Commandant of Artillery.

(Signed) A. F. OAKES, Captain,
Director Artill...

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Plate 18.

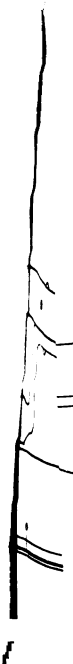
Artillery Depot,
Saint Thomas' Mount,
6th May, 1850.

(Signed) P. Montgomerie, Brigadier,
Commandant of Artillery.

(Signed) A. F. Oakes, Captain,
Director Artillery Depot.

C.B.

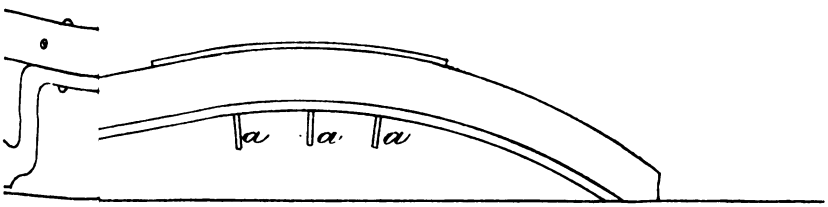
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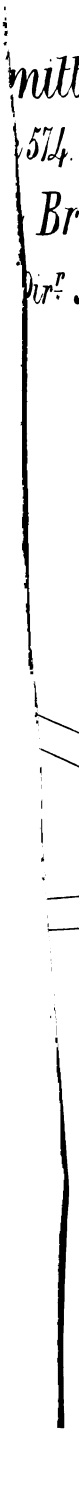
Plate 19.

Side View of a.



C.B.

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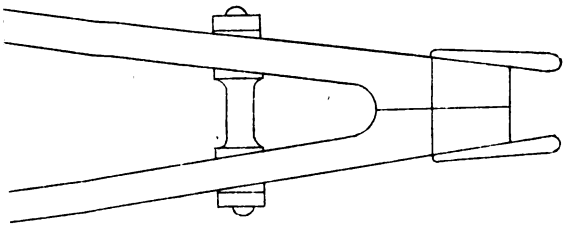
Plate 20.

mittee.

574.

Brass Howitzer.

Dir^{r} Art^{y} Depôt.



C.B.

2 feet.

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Plate 21.

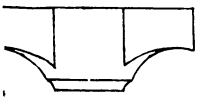
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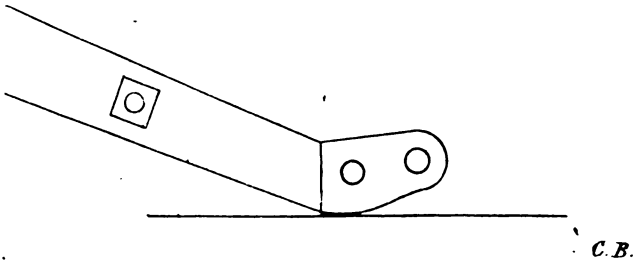
4.

rass Howitzer.

r Art y Depôt.

levating Screw Transom.





2 feet

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Letter No. 2279, from the Secretary Military Board, to the Brigadier Commandant of Artillery, dated 14th May, 1850.

I have the honor, by order of the Military Board, to acknowledge the receipt of the Report of a proof of a 3 Pdr. Brass Gun Iron Carriage, the gun fired with the muzzle over the trail instead of the breech as usual, and to request that you will be so good as to ask the Artillery Select Committee, whether it would not be for the benefit of the service that the perfect feasibility of firing in this manner (objectionable perhaps when the distance from trunnion to cascable exceeds the radius of the wheel) should be made known on authority to the Corps of Artillery at large, as there might be many cases of a spring trail in which more firing would be dangerous in the usual manner and perfectly safe in this.

2. If this were declared to the Regiment by a Committee of so many Field Officers as now constitute the Select Committee, their opinions would, in the opinion of the Board, carry far more weight than the experiments hitherto made by individuals.

3. A contrast of the recoil of the Gun fired (unchecked by rope passed from wheel to wheel) in this manner with that of the same piece and carriage fired in its usual manner, would enable the Select Committee to publish their sentiments, on a very important point hitherto only argued by single individuals, viz., whether it is dead weight, or friction, that checks recoil, it being clear that the dead weight is the same, but the recoil is trebled.

MEMORANDUM OF CAPTAIN A. F. OAKES' EXPLANATION OF THE PRINCIPLE UPON WHICH HE PROPOSES THAT A 3 POUNDER WROUGHT IRON CARRIAGE SHOULD BE CONSTRUCTED FOR MOUNTAIN TRAIN PURPOSES; THE PIECE TO FIRE OVER THE TRAIL.

1st. Suppose an iron axletree of 2·5 inches square with wheels of 3 feet diameter,—place the centre of gravity of a

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3 Pounder exactly over the centre of the axletree, from that position bring the breech one calibre nearer to the axletree.

2nd. Temporarily support the gun in this position, and observe how much in front of the centre of the axletree, a perpendicular dropped from the centre of gravity of the piece would pass.

3rd. Lower the breech until you have obtained an elevation of 5°, and, when doing so, raise the piece at its centre of gravity proportionally, so that the under part of the metal shall be clear of the axle, preserving, at the same time, the positions relatively, of the centre of the axletree and the centre of gravity of the piece.

4th. To determine the length of trail, from the face of the muzzle drop a perpendicular, and that line will be the limitation of the trail's length.

5th. The elevating screw is attached to an iron band which passes round the chase of the piece; the screw works in a transom placed about midway between the axle and trail end: this band answers the double purpose of elevating for action, and depressing when more weight is required on the shafts.

6th. The shafts are fixed to the end of the trail by two bolts; in action the shafts are taken off by removing these bolts. The greatest thickness* of iron in the Carriage is the same as in Major Anstruther's 3 Pounder the trunnion holes excepted which are 1·3 thick, the cheeks are parallel, similar to our Heavy Field pattern, consequently easily constructed and more convenient than any other form for attaching shafts for single draft; pole bands are also fixed for pole draft if wanted. No handspike is required. The wheels to be of light construction, of 3 feet diameter, and with brass naves. I propose to carry the ammunition for the 3 Pounder as suggested for my 5½ Inch on carts, on bullocks, and by hand. Each box would carry 19 rounds: total weight of box loaded between 60 and 70 lbs. The carriage and piece may be carried in a mountainous country as

* ·75 inches.

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suggested for the 5½ inch, apportioning the men in the same manner, so that the average weight to be carried by each man shall not exceed about 35 lbs.

A. F. Oakes, Captain,
Director Artillery Depôt.

Artillery Depot,
St. Thomas' Mount,
19*th June*, 1850.

Memorandum of Captain A. F. Oakes' Explanation of the principle upon which he proposes that a 4⅖ Inch Howitzer Carriage should be constructed for Mountain Train purposes.

I have been guided in drawing up the plan of a wrought Iron Carriage for a 4⅖ Inch Howitzer by recent proofs of Iron Carriages, viz., the 3 Pounder Iron Carriage of Major Anstruther's, and by my 5½ Inch Carriage.

2. In determining the thickness and depth of iron, the former has been my minimum, and the latter my maximum, limitation; I have kept in view that the 4⅖ Inch Howitzer weighs 84 lbs. more than the 5½ Inch Mortar, that its proof and service charge is 2 oz. less, its projectile 8 lbs. less, its length of bore 8·5 inches more, than a 5½ Inch. I have adopted the same wheels as those of my 5½ Inch Carriage; I dispense with a handspike, as the line of direction, when for action, can be better given by means of the common wooden traversing handspike.

3. It is intended for shafts, to be drawn by a pony, and available also for a pole.

4. It may also be carried on my 5½ inch cart with two ammunition boxes and small store box, its length of trail and axle being the same; it may also be transported in the same way by hand, in a mountainous country without roads. The ammunition to be carried in like manner on carts, bullocks,

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and by hand. Each box would carry 6 rounds, total weight of box loaded between 60 and 70 lbs.

ARTILLERY DEPOT,
St. Thomas' Mount,
19*th June*, 1850.

A. F. OAKES, Captain,
Director Artillery Depôt.

Meeting 158, Article 542. Meeting 160, Article 564.

1. The Committee, on referring to a former Meeting on the subject of the description of carriages and beds, &c., to be used for Mountain Train purposes, find that the instructions of the Military Board were to the effect, that the Committee should in the first instance submit their opinion "as to the particular description of carriages and beds best adapted for mountain warfare, preparatory to considering the best means of moving them on service."

2. Captain Oakes' 3 Pounder Wrought Iron Carriage, as described in his Memorandum annexed, and shown in the accompanying drawings, (Plates 18 and 19,) appears to the Committee, judging also from a full sized rough model of it, which has been submitted for their inspection, to be well worthy of experiment; it is expected that this Carriage, when made up, will weigh about the same as Major Anstruther's 3 Pounder Iron Carriage or rather less: if, therefore, the Board would allow of its being constructed, a very good opportunity would be afforded for the Committee to decide by practical experiment the question put to them in para. 3 of the Board's letter, No. 2279, of the 14th of May last, viz., "whether it is dead weight or friction that checks recoil."

3. Captain Oakes has brought to the Committee's notice that, in the construction of the 3 Pounder, he has endeavoured to obtain extra friction of the trail end against the ground, by throwing as much of the weight of the metal between it and the axle as could be done consistently with preserving the proper balance of the carriage for single draught. A comparative proof therefore of the recoil of this carriage and of Major Anstruther's 3 Pounder, both being fired over the

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trail, would at once decide the point, of " whether it is dead weight, or friction, that checks recoil," as in the former Carriage the weight of the trail end from the position of the trunnion holes will be very considerable, and the friction when firing proportionally great; whereas in the latter, owing to the position of the trunnion holes, (viz., over the axle,) the weight of bearing of the trail end on the ground would be very slight and the friction proportionally reduced.

4. The Committee recommend that Captain Oakes' 3 Pounder carriage be made up as an experimental carriage, and that it be proved, after which, the subject of its adaptation to the service for which it is intended may be further considered.

5. Captain Oakes' $4\frac{2}{5}$ Inch Howitzer wrought iron Carriage as described in his Memorandum annexed and shown in the accompanying drawings, (Plates 20 and 21,) appears to the Committee, judging also from a full sized rough model of it which has been submitted for their inspection, to be very well adapted for mountain warfare, and they recommend that a Carriage of this pattern be made up and proved, after which the subject might be further reported upon.

6. In connection with the subject of the several Mountain Train Carriages which have now been under the consideration of the Committee, and referring to the instructions of the Board before alluded to in para. 1, the Committee deem it expedient to take this opportunity of entering upon the question generally of,

1st. Mountain Train Ordnance and their carriages.

2nd. Their Transport.

3rd. The service allotments of each different calibre.

4th. The mode of transporting the allotments:

as a preparatory step to assist the Committee at a future Meeting when these important points will have to be finally decided upon.

7. With regard to the Ordnance best adapted for mountain warfare, the Committee are of opinion, that the following are sufficient:

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5½ Inch to be used as a Mortar or Howitzer.
4⅘ Inch Howitzer.
3 Pounder Gun.

8. The 5½ Inch is already provided with a Carriage and Bed, by the recommendation of the Committee in Article 573 of this Meeting. Captain Oakes' 4⅘ Inch Howitzer Experimental Carriage has yet to be tested. The 3 Pounder Carriages of Major Anstruther's and Captain Oakes' have yet to be tested.

9. The proposed mode of moving these Carriages has been explained in the Memorandum from the Director Artillery Depôt.

10. With regard to the allotment for these pieces the following Table will show the number of rounds recommended, as well as their mode of transport.

ALLOTMENT OF AMMUNITION FOR MOUNTAIN CARRIAGES.

5½ Inch Mortar 102 rounds, 3 rounds in each box.

Carriage Cart two boxes,	6 rounds,.....		6
Ammunition Cart eight boxes,	24 „	× 4 =	96
			102 rounds.

4⅘ Inch Howitzer, 108 rounds, 6 rounds in each box.

Carriage Cart two boxes,	12 rounds,.....		12
Ammunition Cart eight boxes,	48 „	× 2 =	96
			108 rounds.

3 Pdr. Gun, 104 rounds, 13 rounds in each box.

Ammunition Cart 8 boxes,.....104 rounds.

Any two of the above ammunition boxes may be carried by an inferior bullock, and any one box by two men, the weight of each box having been so arranged as not to exceed 70 lbs.

11. The Carts above alluded to have been constructed in the rough by Captain Oakes, Director Artillery Depôt, and were submitted for the Committee's inspection: they seem well adapted for the purpose intended: the Carriage Cart

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will convey a $5\frac{1}{2}$ inch carriage and its Mortar complete, or a $4\frac{2}{5}$ inch carriage and its Howitzer, (or a 3 Pounder complete if necessary,) with two ammunition boxes and one small store box. (See Plates 11 and 12.)

12. The Ammunition Cart will carry eight boxes of the several calibres and a small store box: one of each of these carts [a] and boxes packed [b] will accompany these Proceedings to the Board with drawings and explanations, by which it will be perceived that the weight of the carts will be about one half of a platform cart, with lighter wheels, having a base the same as that of the common country cart, and the axle arm being of the same dimensions as that of a platform cart, in order that the wheels of the one pattern may fit that of the other on an emergency.

(a) Drawing of Carts. Plates 13 and 14.
(b) Boxes roughly constructed.

13. The Committee are unanimously of opinion that the $4\frac{2}{5}$ inch Mortar should be considered an obsolete piece of ordnance, on account of its comparative uselessness, owing to the uncertainty of its practice. The superiority of the $4\frac{2}{5}$ inch Howitzer is generally acknowledged both in India and in the Continental armies, and should the experimental $4\frac{2}{5}$ inch Howitzer Carriage, now submitted, answer the expectations of the proposer, we shall have a portable and most efficient piece complete, which may with advantage take the place altogether of the $4\frac{2}{5}$ inch Mortar and Bed.

Minute by Captain Black.

I cannot concur in recommending the $5\frac{1}{2}$ Inch Mortar as an established piece of Mountain Artillery.

Light pieces, effective with Canister as well as with Shell, have, by general consent, been adopted in Europe, as best suited to this kind of Service, and, I believe, operations in India justify this preference. The $5\frac{1}{2}$ inch Mortar is altogether useless for Canister, and, for horizontal fire of Shells, is inferior to a Howitzer; moreover, by the arrangements suggested for the conveyance of ammunition, double the quantity of carriage is required for 102 rounds for $5\frac{1}{2}$ inch Mortar of what

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suffices for 108 rounds for a $4\frac{2}{5}$ inch Howitzer, the excess being two carts or 32 men equivalent to 1120 lbs. (16 boxes at 70 lbs. each or 10 cwt.), a consideration far outweighing the difference of 84 lbs. between the weights of these two descriptions of Ordnance.

SAINT THOMAS' MOUNT,
26th June, 1850.

(Signed) B. W. BLACK, Captain,
Asst. Adjt. General of Artillery.

MINUTE BY CAPTAIN A. F. OAKES.

With reference to Captain Black's objection to the $5\frac{1}{2}$ Inch Mortar as a Mountain Train Piece, on the ground of its not carrying canister, and of its projectile being twice the weight of a $4\frac{2}{5}$ Inch, I will quote the following opinion of Lieutenant Colonel Colquhoun, of the Royal Artillery.

"The British Artillery possesses Mortars of $5\frac{1}{2}$ Inches ca-
"libre (24 Pounders) in weight 158 lbs., and capable there-
"fore of being employed with good effect, and require but
"small charges: the penetration of the Shell, however is but
"trifling, and a Mortar of larger calibre, say 32 Pounder or
"even higher, which would still be within the limit of trans-
"port on the pack saddle, appears to be advisable."

(Signed) A. F. OAKES, Captain,
Director Artillery Depôt.

ARTILLERY DEPOT,
Saint Thomas' Mount,
29th June, 1850.

Extract from Letter No. 3451, from the Secretary Military Board, to the Brigadier Commandant of Artillery, dated 5th July, 1850.

I have the honor, by desire of the Military Board, to request you will forward to the Superintendent of the Gun Carriage Manufactory, copies of the drawings of Carriages for the brass 3 Pounder Mountain Train Gun, and $4\frac{2}{5}$ inch Howitzer Carriage proposed by Captain Oakes (and reported upon by the Select Committee in Meeting 161, Article 574,) to enable him to construct Carriages for trial.

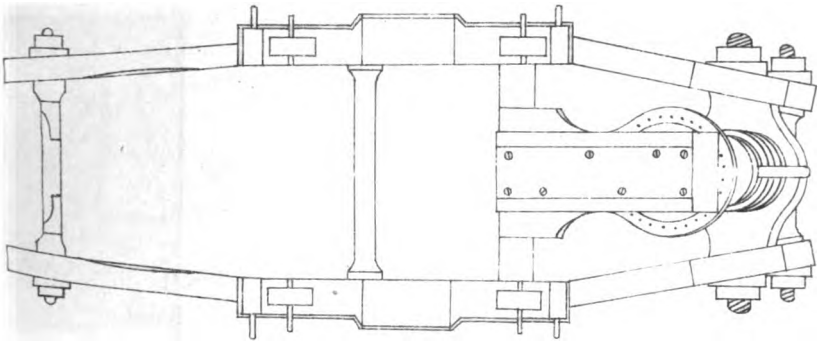
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Plate 22

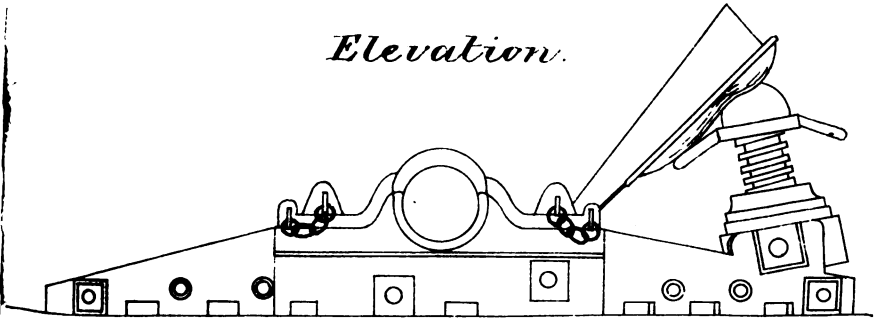
Artillery Select Committee
Meeting 161, Article 575.

Iron Bed
for 4 2/5 Inch Brass Mortar.

Plan.



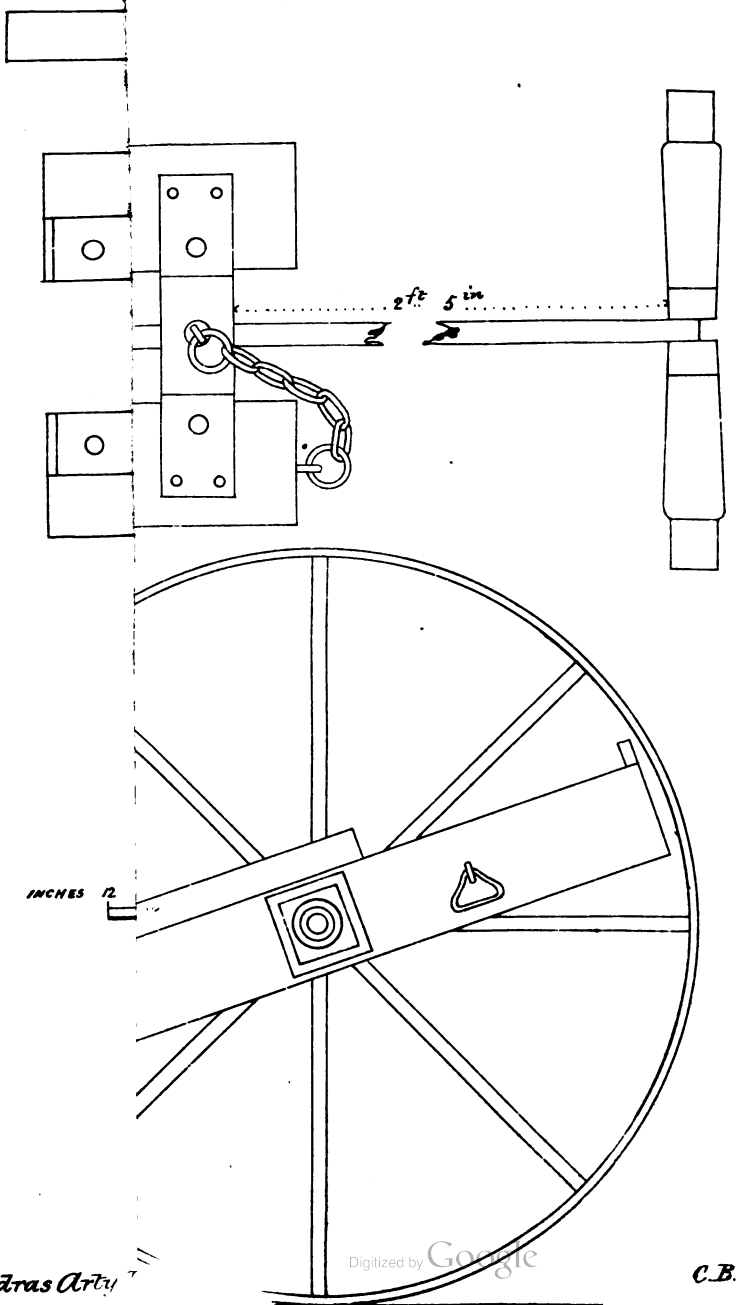
Elevation.



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Brass Mortar.



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ARTICLE 575.

IRON MORTAR BED AND WOODEN PLATFORM FOR A $4\frac{2}{5}$ INCH MORTAR. PLATES 22 AND 23.

Letter No. 191, *from the Superintendent Gun Carriage Manufactory, to the Secretary Military Board, dated 2d May,* 1850.

In reporting the completion of the Mortar Bed, ordered in your letter of the 25th January last, No. 320, with a Platform Cart as suggested to me verbally by the Board, I have the honor to annex a statement of the component parts of the same.

This Platform is arranged for men draught, but, by altering the shape of the handle, a pair of shafts can be made for a horse, pony, or bullock.

There appears to me no difficulty in so arranging the platforms of all Mortars as to make them (the carts) with wheels on which to carry the piece of Ordnance, and the sleepers might then be suspended underneath. Every Mortar would thus be complete with a bed, platform, sleepers, and wheels, and the expense of the Mortar Carts now in use would be saved.

If the Board think proper to entertain this suggestion, I can proceed at once to construct the description of Carts, I think may be built on exactly the same principle as this little Platform Cart; I do not send in plans as I cannot yet state precisely the position of the axle, but the principle of having all the weights so distributed as to be easy in draught, and the mode of attaching the Pole will be carefully attended to.

Referred to the Brigadier Commandant of Artillery, with a request that he will lay the subject before the Artillery Select Committee, and favor the Board with their opinion thereon.

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Statement exhibiting the weight of each Component part of an Iron Bed and Wooden Platform Cart for a 4⅘ Inch Brass Mortar, Gomer Chambered.

Number.	Names of Component Parts.	Weight. lbs.	Weight. ozs.	Remarks.
	BED.			
2	Cheeks,	26	12	
2	Capsquares,	3	11	
4	Keys, Forelock, and Chain,	0	14	
1	Elevating Screw,	3	8	
1	Rivet Washer,			
1	Handle Elevating Screw,			
3	Bolts side,	2	4	
4	Nuts square, 1 + ⅓ inch,	0	6½	
2	„ „ 1⅜ + ½ „	0	7	
2	„ „ 1⅓ + ½ „	0	4½	
6	Washers Slope,	0	13	
1	Semelle,	2	4	
1	Bolt Semelle,	1	0	
1	Nut square, 1¼ + ⅝,	0	3	
2	Cylinders for Semelle Bolt,	0	5	
1	Transom and Elevating Screw Box, Brass,	6	11	
	Total..	49	7	
	PLATFORM CART.			
1	Side Bolt,	1	9½	
4	Washers,	0	12½	
1	Nut square, 1⅝ + ⅝ inch,	0	7	
2	„ „ 1⅞ + ⅝ „	0	13½	
2	„ Circular, 1½ + ½ „	0	6½	
2	Washers,	0	3	
2	Linch Pins,	0	1	
2	Plates Stopper,	1	0	
4	Rings Lashing,	0	8	
1	Axle,	5	7	
1	Tug Pin and Chain,	0	7	
2	Plates Handspike,	2	2	
1	Handspike,	6	15	
18	Screws,	0	8	
2	Ribbands,	1	12	
2	Transoms,	2	14	
1	Bed,	29	0	
2	Wheels,	37	10	
	Total..	92	8	

GUN CARRIAGE MANUFACTORY, MADRAS, 2*d May*, 1850.

(Signed) J. MAITLAND, Captain, *Supt. Gun Carriage Manufactory.*

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Supplementary Proof of an Iron Mortar Bed and Wooden Platform for a 4⅘ Inch Mortar, by order of Colonel P. Montgomerie, C. B., Brigadier Commandant of Artillery, to ascertain the recoil on and off the Platform, with the proof charge of 4 ozs. 10 drs. at the undermentioned Elevations.

Date.	No. of Rounds.	Charge.		Elevation.	Flight.		Range.	Recoil.		Remarks.
		ozs.	drs.	deg.	sec.	pts.	Yards.	ft.	ins.	
25th April, 1850.	1	4	10	6	2	0	190	0	0	Sand was strewed over the surface of the Platform. The Bed recoiled the whole length of the Platform, bending two small Iron Checks in the rear, which stopped it.
	2	,,	,,	6	2	0	175	5	0	The Platform was reversed—The Bed recoiled 3 feet beyond the rear of the Platform.
	3	,,	,,	6	2	0	170	8	0	The rear part of the Platform was raised 8½ Inches, by placing sand bags under it, the Bed recoiled 6 feet beyond the rear.
	4	,,	,,	6	0	0	210	11	0	Do. do. do. 11½ Inches recoil 9 feet beyond the rear.
	5	,,	,,	6	0	0	190	4	0	Do. do. do. 11½ Inches and the Bed lashed to the Platform—The Platform recoiled with the Bed.
	6	,,	,,	12	4	0	530	10	0	The Platform was laid level, and the Bed unlashed. The Bed recoiled 8 feet beyond the rear.
	7	,,	,,	12	0	0	not taken	12	0	Do. do. do. do. 10 feet do.
	8	,,	,,	18	0	0	not taken	7	0	A sand bag was placed raising the rear of the Platform 6 Inches, recoil 5 feet beyond the rear of the Platform.
	9	,,	,,	45	13	0	728	2	0	The Bed was placed on the ground.
	10	,,	,,	45	13	30	856	3	6	The Bed was placed on the Platform, and recoiled 18 Inches off it.
	11	,,	,,	45	13	0	782	3	6	

Artillery Depot,
Saint Thomas' Mount,
25th April, 1850.

(Signed) P. Montgomerie, Brigadier,
Commandant of Artillery.

(Signed) A. F. Oakes, Captain,
Director Artillery Depôt.

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OPINION.—It will be perceived, by referring to Article 574 of this Meeting, that the Committee are unanimously of opinion that the $4\frac{2}{5}$ inch Mortar is an inefficient piece for Artillery Service and have recommended that it be rejected as obsolete, had they not been of this opinion, the bed now submitted to them would have met with their full approval.

2. With regard to the small platform cart, the Committee very much doubt its utility on service, either as a cart with wheels, or as a platform; the wheels are of so fragile a construction, that 2 out of 4 wheels were injured on their way from Madras to the Mount, on a perfectly level road; so that they are evidently unserviceable, and with regard to the platforms, as they are never used with the Madras Artillery with Mortars of less calibre than an 8 inch, the Committee do not see what advantage would attend their adoption; on platform carts they would be cumbrous, and take up a great deal of valuable space. For example, a platform cart without these platforms would carry 6-$4\frac{2}{5}$ inch Mortar beds, and with the platforms only 3 beds; on these grounds the Committee disapprove of the introduction of these platforms.

ARTICLE 576.

$4\frac{2}{5}$ INCH BRASS MORTAR WITH A CONICAL CHAMBER, REAMED OUT, SO AS TO FORM A GOMER CHAMBER.

In conformity with the instructions[a] of the Military Board, a $4\frac{2}{5}$ Inch Brass Mortar with a Conical Chamber, having been reamed out, so as to form a Gomer Chamber, as recommended by the Permanent Artillery Select Committee,[b] the following Practice which has been carried on at Artillery Head Quarters is laid before the Committee, who are required to record their opinion, as to the relative merits of these different descriptions of chambers for a $4\frac{2}{5}$ Inch Mortar.

(a) No. 1254, 27th July 1849, page 968. No. 2058, 3d May 1850.

(b) Meeting 155, Article 527, Page 966.

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Table showing the average ranges of the Comparative Practice with Conical and Gomer Chambered $4\frac{2}{5}$ Inch Brass Mortars, as ordered by the Military Board in letter No. 2058, 3d May, 1850. Elevation 45 and 15 degrees, commencing at 200 yards, and increasing 100 yards after firing 6 rounds from each piece to 1000 yards.

Dimensions of Conical and Gomer Chambered $4\frac{2}{5}$ Inch Mortars.

Ordnance.	Weight.			Length.			Diameter of Bore.				Diameter of Chamber.				Chamber contains.			Shape of Chamber.	Length. Bore.		Length. Chamber.		Distance of shell from entrance at muzzle of Mortar.	
							Horizl.		Vertical.		Horizl.		Vertical.											
	cwts.	qrs.	lbs.	feet.	ins.	pts.	ins.	pts.	ins.	pts.	ins.	pts.	ins.	pts.	lbs.	ozs.	drs.		ins.	pts.	ins.	pts.	ins.	pts.
$4\frac{2}{5}$ Inch Brass Mortar,	0	3	13	1	1	50	4	53	4	53	2	20	2	20	0	5	0	Conical	7	0	3	70	2	75
$4\frac{2}{5}$ „ „ „	0	3	$4\frac{1}{2}$	1	1	40	4	53	4	53	4	54	4	54	0	12	4	Gomer	5	12	6	15	3	30

Previous to the 2nd day's Practice, the following precautions were taken with the view of obtaining shells for the two Mortars of the same gauge. Each pair of shells found of exactly the same dimensions was marked for the Conical and for the Gomer Mortars, and numbered from 1 to 18, viz.: the number of rounds fired each morning and the pairs from 1 to 18, were fired in the same order each morning (*i. e.*) Nos. 1 were fired with each first shot Nos. 2 with each second shot and so on.

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No. 1, is the actual average of all the rounds fired.

No. 2, is calculated by taking $\frac{1}{10}$ of the actual average range, adding to, and subtracting the same therefrom, and taking these results as the two extremes; all ranges above and below these extremes being rejected, the medium is then calculated from the remainder.

Rounds.	Elevation.	Flags distance.	Conical.				Gomer.			
			Charge.		Average Range.		Charge.		Average Range.	
					No. 1.	No. 2.			No. 1.	No. 2.
No.	deg.	yards.	ozs.	drs.	yards.	yards.	ozs.	drs.	yards.	yards.
6	45	200	1	4	197	201	2	0	203	211
6	,,	300	1	9	359	351	2	7	268	277
6	,,	400	1	14	506	506	2	14	384	368
6	,,	500	1	14	476	459	3	7	529	529
6	,,	600	2	$1\frac{1}{2}$	568	568	3	15	709	709
6	,,	700	2	$7\frac{1}{2}$	725	725	3	15	695	695
6	,,	800	2	$10\frac{1}{2}$	733	733	4	3	741	741
6	,,	900	2	$14\frac{1}{2}$	835	835	4	9	833	851
6	,,	1000	3	3	879	869	4	15	978	978
6	15	200	1	9	214	207	2	4	179	166
6	,,	300	2	8	362	370	4	0	357	345
6	,,	400	2	14	485	465	4	7	455	447
6	,,	500	3	0	630	630	4	14	513	516
6	,,	600	3	0	613	609	6	0	739	718
6	,,	700	3	8	668	674	6	0	681	682

ARTILLERY DEPÔT,
Saint Thomas' Mount,
1*st June*, 1850.

(Signed) A. F. OAKES, Captain,
Director Artillery Depôt.

OPINION.—The Committee have carefully examined the experimental comparative practice between the Gomer and Conical Chambered Mortars, but they do not consider that any sufficiently satisfactory results have been shown to justify either one or other of the Mortars being preferred; as the Committee in Article 574 have recommended the $4\frac{2}{5}$ Inch Mortar being considered obsolete, it may not be necessary for them to enter further into this subject.

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ARTICLE 577.

On the subject of Intercommunication between the Select Committees of the three Presidencies.

(a) Former Meetings on the same subject.

	Page
Meeting 152, Article 464,	616 to 617.
Supplementary,	683 to 687.
Meeting 155, Article 522,	955 to 957.

Adverting to the subject of intercommunication[a] between the Select Committees of the three Presidencies, the following question is now laid before the Select Committee by the Military Board for special consideration, whether it would not be advisable to prepare two Indices to all their Proceedings, one arranged by Meetings showing the subject of each article, and the other alphabetically for transmission to Bombay.

The following documents are laid before the Committee.

(b) No. 2760, 31st May, 1850. 1*st. Letter from the Secretary Military Board, to the Brigadier Commandant of Artillery.*[b]

(c) No. 1284, 19th Mar. 1850. 2*d. Letter from the Secretary Madras Military Board, to the Secretary Bombay Military Board.*[c]

(d) No. 1201, 23d May, 1850. 3*d. Letter from the Secretary Bombay Military Board, to the Secretary Madras Military Board.*[d]

(e) No. 20, 9th May, 1850. 4*th. Letter from the Bombay Permanent Artillery Select Committee, to the Secretary Bombay Military Board.*[e]

(f) No. 2759, 31st May, 1850. 5*th. Letter from the Madras Military Board, to the Secretary Bombay Military Board.*[f]

Opinion.—The Committee have perused the correspondence upon this subject with much interest, and are unanimously of opinion that two Indices of all the Proceedings should be prepared, and arranged by Meetings; one showing the subject of each article, and the other alphabetically, for transmission to Bombay.

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Extract from a Letter No. 3443, from the Secretary Military Board, to the Brigadier Commandant of Artillery, dated 5th July, 1850.

I am desired by the Military Board to acknowledge the receipt of the Report of the Artillery Select Committee in Meeting 161, Article 577, and to express the Board's approval of the Proceedings of the Committee respecting the interchange of communication with the Bombay Permanent Artillery Select Committee.

The Board will have no objection to a Precis being made by the Secretary of the Committee, of the communications referred to in the Report, and appended thereto, to be printed.

PRECIS OF THE CORRESPONDENCE ON THE INTERCHANGE OF IDEAS, BETWEEN THE ARTILLERY SELECT COMMITTEES OF THE MADRAS AND BOMBAY PRESIDENCIES.

Letter No. 2760, from the Secretary Military Board, to the Brigadier Commandant of Artillery, dated Fort St. George, 31st May, 1850, transmits:

(a) No. 1842 of 19th March, 1850.

1st. A letter(a) addressed to the Military Board Bombay, as to the desirableness of an interchange of ideas between the Madras Permanent Artillery Select Committee, and the Bombay Artillery Select Committee, on the various subjects which from time to time may come before them, requests that two copies of all future proceedings of the Bombay Artillery Select Committee may be supplied, and adds that, if the proceedings of the Bombay Committee from 1840 to the present period could be printed, much useful information would doubtless be derived therefrom.

2d. Reply of the Bombay Military Board in letter No. 1201, of date 22d May, 1850, together with a Report from the Permanent Select Committee of Artillery Officers,(b) acceding to the proposal of intercommunication, and requests the opinion of the Madras Military Board, on the point advanced by the Committee (Bombay),

(b) No 20 of 9th May, 1850.

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namely that the intercommunication be strictly confined to subjects of "importance and general applicability to both Presidencies," and also, that such of their records only from the year 1840, be selected and printed as may be considered useful and of general interest.

II. The Military Board entirely approve of the above principles for guiding the two Select Committees in their communications, and to guard against the proceedings of the two Committees being encumbered with unimportant papers, the Secretaries of the two Committees might be placed in direct communication, and a little experience would enable them to judge what is important and unimportant.

III. The Board suggest that the Committee should lose no time, in preparing two Indices to all their Proceedings, one arranged by Meeting, and the other alphabetically.

Letter No. 2759, from the Military Board, Madras, to the Military Board, Bombay, dated 31st May, 1850, stating their opinion of the suggestions contained in Military Board's letter from Bombay being well adapted to prevent the Proceedings of the Committees being encumbered with useless or unimportant questions; that there need be no restriction as to time placed on reference to the Records of the Madras Select Committee for any information, as their proceedings since its formation in 1824 have been printed or lithographed, and that the Committee have been called upon to prepare and forward the index of their Proceedings. The Board suggest that the Secretaries of the two Committees be placed in communication with each other to arrange the details of the mode of communication, of printing the Proceedings, their form and cost, and of interchanging information on any points that may be required.

II. The Board solicit the favor of the Bombay Committee's Proceedings on platforms, as also any information as to the pattern of Mountain Train Carriages, and the best means of moving the same.

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ARTICLE 578.

ON THE SUBJECT OF THE BOMBAY MODE OF PRIMING ORDNANCE WITH CARTRIDGES.

Letter No. 2845, *from the Secretary Military Board, to the Brigadier Commandant of Artillery, dated* 12*th June,* 1850.

I have the honor to enclose, in original, a letter* from the Secretary Military Board, Fort William, transmitting Extract of a letter from the Commissary of Ordnance, Peshawar, (Captain Hogg of the Bengal Artillery) suggesting that the Bombay mode of priming Ordnance with blank cartridges is preferable to the mode in use with the Bengal (also Madras) Artillery of priming with loose powder, and to request that you will submit the question for the report of the Permanent Artillery Select Committee, to enable the Board to comply with the request of the Bengal Board, and the occasion may be taken advantage of to review the various attempts made to abolish priming with loose powder, introducing detonating tubes, tubes priming, charges, &c. &c.

* No. 675 of 28th May, 1850, to be returned.

OPINION.—The Committee are of opinion that the Bombay mode of priming Ordnance with cartridges is preferable to the Bengal and Madras plan of priming with loose powder, and they recommend that it be tried by Commanding Officers of Corps at Artillery Head Quarters, at Bangalore, at Secunderabad, and at Kamptee.

Letter No. 3439, *from the Secretary Military Board, to the Brigadier Commandant of Artillery, dated* 5*th July,* 1850.

I am desired by the Military Board to convey their sanction to the experiment of priming Ordnance with blank cartridges being tried at the several Stations, as recommended by the Artillery Select Committee in Meeting 161, Article 578.

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2. The Board request you will fix the size of paper to be used for each cartridge, and dimensions of cartridges, the number of drams of Gunpowder for each charge, the mode of making up the cartridges, tying and carrying them, the Pouch to contain the cartridges, and the mode in which the priming is to be applied.

3. When these several points have been provided for, by experiments at the Artillery Depôt, and by practice with the Batteries at Head Quarters, the Board will issue the requisite orders for Out stations.

ARTICLE 579.

WAGGON AND LIMBER OF THE SELECT COMMITTEE PATTERN BUILT WITH PEDDOWK WOOD.

Under instructions from the Military Board,[a] a Waggon and Limber made of Peddowk wood of the Select Committee Pattern is submitted for the inspection of the Committee, and their "early opinion" is required "as to its fitness in every respect for the "Service."

(a) No. 3035, 25th June, 1850.

Statements of the Weights and Dimensions showing the difference between this Pattern of Waggon and existing ones, are laid before the Committee.

Pattern and Nature of Wood.	Waggon.			Limber.			
	cwts.	qrs.	lbs.	cwts.	qrs.	lbs.	
1. Col. Cullen's (Teak) No. 100 of 1839, -	11	0	15	12	3	24	
2. Special Board (Teak)	No Marks.						
3. G. O. G. (Teak) No. 78 of 1846, - -	12	2	22	11	1	24	
4. SelectComttee.(Teak) 6 Pdr. No. 1 of 1846,	13	2	9	11	2	13	
5. SelectComttee.(Saul) 12 Pounder Howitzer No. 40 of 1849, -	15	0	21	12	2	4	
6. Peddowk, - - -	11	0	4	10	0	24	Under Report

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1. The Committee observe the following differences between the Peddowk wood Waggon and that of the Established Pattern.

	Peddowk wood.		Established Pattern.	
	Feet	Inches	Feet	Inches
Length of Body of Waggon, -	5	4	6	0

The above difference in length of body, viz. 8 inches, is caused by the following alterations in the component parts.

	Established Pattern.	Peddowk wood.	Difference.
Breadth of front foot bar,	Inches 2·5	Inches 2·	Inches ·5
„ „ rear „ „ „	2·5	„ 2·	„ ·5
„ „ front foot board, „	6·75	„ 4·	„ 2·75
„ „ rear „ „ „	6·75	„ 4·	„ 2·75
„ „ bottom cross 1st size, „	3·	„ 2·5	„ ·5
Projection of side framing in front, - - - - - „	1·2	„ ·7	„ ·5
Projection of side framing in rear, - - - - - „	1·2	„ ·7	„ ·5
			Inches..8

	Established Pattern.		Peddowk wood.		Difference.	
	Feet	Inches	Feet	Inches	Feet	Inches.
Length of Beam, -	3	6·25	3	1·5	0	4·75
From centre of Waggon Axle to centre of Limber Axle,	8	8·	7	6·	1	2·
Distance from Waggon wheel to Limber Wheel,	3	7·75	2	7·	1	7·5
Length of perch on Limber,	1	3·	0	10·5	0	5·5

There is also a difference in the pattern of the pintle loop —Beam end—and foot bar.

Opinion.—2. The Waggon has every appearance of being a perfectly serviceable one, and being built of Peddowk wood it will doubtless be durable, judging from the severe test which the experimental 12 Pdr. Howitzer Peddowk Carriage has undergone at Secunderabad.

3. The Committee cannot judge of the fitness of this Waggon for Service, until it has been tried in the usual manner they therefore recommend that, when completed, it may be tested in such way as the Brigadier Commandant of Artillery may think proper.

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SUPPLEMENT TO ARTICLE 540. "DESAGUILIER'S INSTRUMENT FOR SHOWING THE INDENTATIONS IN THE BORE OF A PIECE OF ORDNANCE." Page 1001.

Letter No. 4485, from the Secretary Military Board, to the Brigadier Commandant of Artillery, dated 20th August, 1850.

Meeting No. 157, Article 540, dated 29th September 1849.

In reference to Extract Artillery Select Committee's Proceedings, number and date as per margin, I have the honor, by desire of the Military Board, to forward the accompanying Extract from a letter* from the Honorable Court of Directors declining to furnish a Desaguilier in reply to our application as per margin.

* To be returned.

Letter to Government No. 133 of 19th October 1849.

Extract from a Letter from the Honorable the Court of Directors, dated 12th June 1850, No. 39.

Letter dated 4th December, 1849, No. 138. 5. Request that the Madras Artillery may be furnished with a "Desaguilier."

Para. 5. This is a very expensive Instrument, and not considered to be necessary except where there is a Foundry. Upon this ground, we refused our sanction to a similar application from Bombay. There is but one Instrument of this description in use in this country, and that at the Cannon Foundry in the Royal Arsenal.

MILITARY DEPARTMENT.

No. 2967.

Extract from the Minutes of Consultation, 16th August 1850.

Ordered, that this para. be communicated to the Military Board, with reference to Minutes of Consultation, 26th October 1849, No. 3921.

SUPPLEMENT TO ARTICLE 554. "ON THE SUBJECT OF AXLE-TREES, WITH A VIEW TO ESTABLISHING SIMPLIFICATION AND UNIFORMITY OF PATTERN." Page 19.

Letter No. 4237, from the Secretary Military Board, to the Brigadier Commandant of Artillery, dated 9th August 1850.

Referring to the Report of the Artillery Select Committee, in Meeting 159, Article 554, I am desired by the Military Board to transmit to you in original, Letter* No. 195, of 3d April 1850, and drawing of Axle Arms from the

* To be returned. Board's No. 5844, No. 11 of M. 9th April 1850.

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Superintendent Gun Carriage Manufactory, which the Board are of opinion will form a useful explanatory Appendix to the Committee's Report.

Letter No. 195, from the Superintendent Gun Carriage Manufactory, to the Secretary Military Board, dated 3d April 1850.

In compliance with your letter No. 1208 of the 15th instant, I have the honor to forward a drawing* of Light Field Axle Arms with their dimensions marked on the same.

The following statement shows the dimensions of the Axle arms and Nave boxes of each of the Light Field existing patterns.

		9 Pounder Gun and 24 Pounder Bowtzr.	6 Pounder Gun and 12 Pounder Howtzr.	
Length of Arm,....	Select Committee,	13	13	
	Special Board's,...	13	13	
	Colonel Cullen's,...	13	13	
	G. O. G. 1842,.....	$16\frac{3}{4}$	$16\frac{3}{4}$	
Diameter large end,.....	Select Committee,.	3	3	
	Special Board's,...	3	3	
	Colonel Cullen's,..	3	$2\frac{3}{4}$	
	G. O. G. 1842,....	3	3	
* Diameter small end,.....	Select Committee,	$2\frac{5}{8}$	$2\frac{5}{8}$	
	Special Board's,...	$2\frac{613}{1000}$	$2\frac{613}{1000}$	or nearly $\frac{5}{8}$.
	Colonel Cullen's,...	$2\frac{1}{4}$	$2\frac{1}{4}$	* The small end of the Axle is measured at the end of the length of the nave box.
	G. O. G. 1842,.....	$2\frac{1}{8}$	$2\frac{1}{8}$	
Length of Box,....	Select Committee,	10	10	
	Special Board's,...	10	10	
	Colonel Cullen's,..	$9\frac{3}{4}$	$9\frac{3}{4}$	
	G. O. G. 1842,.....	12	12	
Diameter large end,.....	Select Committee,	3	3	
	Special Board's,...	3	3	
	Colonel Cullen's,...	3	$2\frac{3}{4}$	
	G. O. G. 1842,..	3	3	
Diameter small end,.....	Select Committee,	$2\frac{5}{8}$	$2\frac{5}{8}$	
	Special Board's,...	$2\frac{613}{1000}$	$2\frac{613}{1000}$	or nearly $\frac{5}{8}$.
	Colonel Cullen's,...	$2\frac{1}{4}$	$2\frac{1}{4}$	
	G. O. G. 1842,.....	$2\frac{1}{8}$	$2\frac{1}{8}$	

* Plate 24.

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From the above Statement it will be observed that, to assimilate to the Select Committee pattern, the Special Board's pattern requires very little or no alterations with the exception of taking away the screw nut and substituting the drag washer and linch pin in its stead. As the alterations in Colonel Cullen's pattern will be very considerable I would beg to suggest that, that pattern wheels remain as they are till the Carriages wear away out of the Service, the construction of the latest of which dates some 12 years ago, so that they cannot remain serviceable many years more. But should the Board consider, that they also should be made to conform to the Select Committee pattern the following alterations will be required.

1. New axle arms of the Select Committee pattern.
2. Nave boxes to be reamed out to fit the Select Committee pattern.
3. The friction plates to be renewed or altered.
4. Washers of $\frac{1}{4}$ inch for the Axle arms.
5. The space in the nave box for the collar of the friction plates to be fitted with a brass washer.

The G. O. G. 1842 pattern may also be altered by cutting the arms to the required length of 10 inches, and reducing the naves also one inch on each side, but perhaps this process may affect the strength of the wheels, it would bring the groove for the grease in the axle within an inch of the end.

DIMENSIONS OF AXLE.

	Cullen's Pattern.		Special Board's Pattern.	G. O. G. of 1842 Pattern.	Artillery Select Committee Pattern.
	1st Size.	2d Size.			
Length of Arm, - -	13	13	13	$16\frac{3}{4}$	13
Diameter of large end, -	$2\frac{3}{4}$	3	3	3	3
Diameter of small end, -	$2\frac{1}{2}$	$2\frac{3}{4}$	$2\frac{613}{1000}$	$2\frac{1}{2}$	$2\frac{5}{8}$
Length of Boxes, - -	$9\frac{3}{4}$	$9\frac{1}{2}$	10	12	10

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SUPPLEMENT TO ARTICLE 575. "IRON MORTAR BED AND WOODEN PLATFORM FOR A $4\frac{2}{5}$ INCH MORTAR." Page 65.

Letter No. 3653, *from the Secretary Military Board, to the Brigadier Commandant of Artillery, dated* 5*th July* 1850.

I have the honor by order of the Military Board, to acknowledge the receipt of Proceedings of Artillery Select Committee, Meeting 161, Article 575, and to request you will inform the Committee, that it does not rest with the Military Board, to discontinue the use of the $4\frac{2}{5}$ inch Mortar, the Court of Directors having ordered* its retention, "as a Piece likely to be useful in India," particularly in Mountain war, or Jungle clearing.

*Vide Court's Letter No. 65, of date 29th August 1838, published in A. Os. No. 545 of 15th March 1839.

2. The Board regret that the Committee did not confine themselves to the question of the comparative goodness of this Bed, and the Platform, which however must be furnished with stronger wheels, those lately built by Captain Oakes, might be lent to this Platform for experiment, an axle being made for them.

3. The Board request you will send the Platform and the small wheels of Captain Oakes' construction, to the Gun Carriage Manufactory, to have an axle fitted, and the opinion of the Committee on the question, as *then* before them, will again be asked, and this letter will be attached to the Proceedings of the Committee, a copy of this will be furnished to the Gun Carriage Department, as authority for constructing the axle required.

MOVEABLE ARTICLES INCLUDED IN THE WEIGHT OF A GUN CARRIAGE.

Letter No. 4899, *from the Secretary Military Board, to the Brigadier Commandant of Artillery, dated* 4*th September,* 1850.

I am instructed by the Military Board to request you will be good enough to direct, that a copy of your communication

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No. 536, dated the 2d Instant, on the subject of the Moveable Articles, included in the weight of a Gun Carriage, may be recorded on the Proceedings of the Artillery Select Committee.

Letter No. 536, from the Brigadier Commandant of Artillery, to the Secretary Military Board, dated 2d September 1850.

No. 4501.
Specifying the names of the moveable articles now included in the weight of a Gun Carriage and calling for an opinion, as to whether the system of the Special Board might not be preferred to the one now in use.

In acknowledging the receipt of your letter dated 21st ultimo, number and subject as per margin, I have the honor to state that I concur with the opinion of the Military Board, that it would be expedient to adopt the system of the Special Board, for designating the weights of Carriages, in preference to the one now in use, so far as it would thereby ensure uniformity at the three Presidencies, viz.:

	lbs.
Carriages with Axletrees and Locking chains,*	000
Wheels,	000
Limber with Boxes,	000
Wheels,	000
Total..	000

* The Locking chains are obliged to be included for the reason stated in para. 2.

As the weights however are all marked upon the Carriages that have been made up according to the old plan, it would seem inexpedient for the alteration to have a retrospective effect, and Officers of Ordnance and Artillery should be fully apprised of the date from which the alteration takes effect, in order to avoid confusion hereafter.

2. I do not think the change will exhibit any marked diminution of weight. The handspikes have always been a fixture, and the difference of weight between the old wooden ones and the present iron ones is trifling, the locking chain weighs under 20 lbs., and it would not be prudent to consider it moveable on any ground, for steep banks of Nullahs and Rivers occur in the most level country when the chain may be required.

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MEETING 162.

EXTRACT FROM THE PROCEEDINGS OF THE PERMANENT ARTILLERY SELECT COMMITTEE, ASSEMBLED BY ORDER OF COLONEL P. MONTGOMERIE, C. B., BRIGADIER COMMANDANT OF ARTILLERY.

Artillery Depôt, Saint Thomas' Mount, 6th September, 1850.

Present.

LIEUT. COL. F. F. WHINYATES, *Principal Commissary of Ordnance.*
LIEUT. COL. P. HAMOND, *Commanding 5th Battalion Artillery.*
LIEUT. COL. H. S. FOORD, *Commanding 4th Battalion Artillery.*
LIEUT. COL. G. ALCOCK, *Commanding 2d Battalion Artillery.*
MAJOR P. J. BEGBIE, *Acting Director Artillery Depôt.*
MAJOR J. W. CROGGAN, *2d Battalion Artillery.*
CAPTAIN T. LAVIE, *Superintendent Gunpowder Manufactory.*
CAPTAIN J. MAITLAND, *Superintendent Gun Carriage Manufactory.*
CAPTAIN B. W. BLACK, *Assistant Adjutant General of Artillery.*

ARTICLE 580.

A 12 POUNDER HOWITZER CARRIAGE BUILT OF PEDDOWK WOOD OF REDUCED DIMENSIONS IN IRON AND WOOD WORK.

The Military Board call[a] for the opinion of the Artillery Select Committee on a 12 Pounder Howitzer Experimental Carriage built of Peddowk wood of reduced dimensions in Iron and Wood work.

(a) No. 2816, 12th June, 1850.

	cwt.	qrs.	lbs.
Weight of Carriage and Wheels, - - -	11	0	18

The following Documents are laid before the Committee:

1. *Letter from the Superintendent Gun Carriage Manufactory, to the Secretary Military Board.*[b]

(b) No. 341, 6th June, 1850.

2. *Letter from the Secretary Military Board, to the Brigadier Commandant of Artillery.*[c]

(c) No. 2816, 12th June, 1850.

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3. *Letter from the Superintendent Gun Carriage Manufactory, to the Secretary Military Board with Statement.*[d]

(d) No. 370, 20th June, 1850.

4. *Letter from the Superintendent Gun Carriage Manufactory, to the Secretary Military Board, with a Statement.*[e]

(e) No. 376, 22d June, 1850.

5. *Letter from the Secretary Military Board, to the Brigadier Commandant of Artillery.*[f]

(f) No. 2982, 21st June, 1850.

6. *Letter from the Superintendent Gun Carriage Manufactory, to the Secretary Military Board.*[g]

(g) No. 363, 19th June, 1850.

7. *Memorandum from the Director Artillery Depôt, to the Brigadier Commandant of Artillery.*[h]

(h) No. 409, 25th June, 1850.

OPINION.—1. The Committee consider frequent changes of Pattern to be exceedingly detrimental to the efficiency of the Regiment, still, as the Carriage now before them is one-fifth lighter than the Select Committee Pattern Carriage, they recommend that this Carriage should be subjected to the severest test in addition to the extraordinary Proof of 90 rounds which it has already undergone before any alteration to the existing established pattern is made.

2. The test the Committee recommend is, that the Carriage should be sent to Nagpore, that on its arrival it should be made over to the Troop of Horse Artillery for use for one year and then returned to the Mount, when the Select Committee will again take under consideration the several points as hereafter noticed which have been referred to them by the Military Board.

3. The Committee consider, (and Captain Maitland in his place confirms the opinion,) that the Superintendent of the Gun Carriage Manufactory has not succeeded in bringing the wood work of a Peddowk Carriage to the same weight as that made of Teak; they do not however understand the Board's observation that the wood work of the Peddowk

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Carriage is one-third heavier than the Teak, the density of Peddowk being to that of Teak as 54 to 43.

4. The Committee are of opinion that Peddowk wood might be used in the construction of portions of Gun Carriages when Teak is not procurable, but they prefer the use of Teak of good quality in the general construction of Gun Carriages when it can be procured.

MINUTE BY LIEUT. COLONEL P. HAMOND, MAJOR J.W. CROGGAN, AND CAPTAIN B. W. BLACK.

It appears to us premature to give an opinion on the comparative merits of Teak and Peddowk, at least before the result of the Experimental march recommended by the Committee be known.

(Signed) P. HAMOND, Lieut. Colonel,
„ J. W. CROGGAN, Major,
„ B. W. BLACK, Captain.

MINUTE BY LIEUT. COLONEL ALCOCK.

I dissent from the opinion recorded by the majority of the Committee.

1st. Because I find that since the year 1828, twelve descriptions of carriages have been introduced for the 6 Pounder, while ten different kinds have been made up for the 9 Pdr. Gun; in the one case the Carriages increased from 2,307 lbs. to 2,836 lbs. in weight, and in the other from 2,531 lbs. to 2,929 lbs., and now, after a course of twenty-two years experiments (supposing the alterations and suggestions to have commenced in the year 1828,) the Corps is without any Established pattern Gun Carriage or Limber for Field Artillery. I am therefore convinced that any further trials, not vitally important, will create further delay, as it is self evident that an indefinite number of experiments, continued through an indefinite series of years, must certainly frustrate the object in view, and instead of tending to the efficiency of the Corps, its effect would be quite the reverse.

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2d. I consider the reduction in the Iron work very dangerous in itself, and not worth the expense and trouble of experiment; it is notorious that the carriages now in use are made of different woods, and a diminution in the Iron work that might answer in one Carriage, would most probably prove fatal to another; again, the decrease in the scantlings, said to be trifling, is another change in the pattern of the Carriage which is highly objectionable. I take leave further to point out that the Carriage before the Committee has been altered, under the immediate observation of the Superintendent of the Manufactory, by the most skilful workmen, and although under these very favorable circumstances it may stand a year's test (which I deem wholly insufficient,) it is exceedingly doubtful to me whether the remainder of our equipment could be altered in the different Arsenals by less experienced Artificers, not equally interested in the success of the experiment, and as the Carriages in use vary both in pattern and material, it will be no easy matter, and need no common judgment to adopt these alterations without injuring them; and, if successful, in the end it will only increase the existing confusion in the Field Equipment of the Corps.

3d. After Captain Maitland's opinion, I would abandon the use of Peddowk wood altogether, for I do not think Teak can ever be wanted, and as the Carriage under report is made of Peddowk wood, which the Committee are disposed to condemn altogether, I consider it a useless waste of time and money, experimenting on it in any way, as I have already endeavoured to prove that it must retard the establishment of any Gun Carriage.

(Signed) G. Alcock, Lieut. Colonel,
2d Battalion Artillery.

Minute by Captain Maitland.

Peddowk wood has already been tried severely, and found both by this Committee and by the Officer Commanding Ar-

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tillery, Hyderabad Subsidiary Force, to have stood the severe test of six months' exposure, during the hottest weather, at the Mount, during which time it was used daily, and one year's work at Secunderabad without a flaw or a crack, or sustaining damage of any kind.

Lieutenant Colonel Alcock has entirely misapprehended me; I admit I have not in this one experiment brought down the weight of the wood work of the Experimental Block Trail Carriage so low as that of a Cullen's close trail pattern carriage, but I do not on that account see any reason to condemn Peddowk wood as useless; so far from condemning it, I think we should rejoice that such a tough, strong, excellent, timber has been found, and I think that it should be used wherever great strength is required, as for instance in splinter bars, poles and beams of light Field, and in cheeks of heavy Field, or Garrison, Carriages.

This Experimental Carriage is *not* a new pattern, it assimilates in all essential points to the Artillery Select Committee pattern. * * * * *

GUN CARRIAGE MANUFY., *Madras, 14th Sept.* 1850. } (Signed) J. MAITLAND, Capt., *Supt. Gun Carriage Manufy.*

Letter No. 5494, *from the Secretary Military Board, to the Brigadier Commandant of Artillery, dated 24th September,* 1850.

The Military Board desire me to state, in reference to the Proceedings of the Select Committee in Article 580, of Meeting 162, that the experimental 12 Pdr. Howitzer Carriage was authorized by the Board, to be constructed on the application of the Superintendent Gun Carriage Manufactory, with a view to test the feasibility of, using the heavy Peddowk wood, by reducing the scantling of the component parts, so far as to make them of the same weight as those of Teak

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wood; as it would appear by the 3d para. of the Committee's report, the Superintendent has failed in effecting this object, the Board see no advantage in continuing this experiment by any further trials with this Carriage for this object. The Military Board quite concur with the Select Committee, that Peddowk wood might be used in the construction of *portions* of Gun Carriages, but it will require considerably more experience, than is at present possessed, to determine for what parts this wood may be employed, whilst it appears highly objectionable to use it indiscriminately for all parts of Carriages.

2. The important feature in this experimental carriage, is in respect to the great reduction in the weight and dimensions of the iron work, which the Board think, might with advantage, be further considered, and they therefore request that the Statements of the iron component parts may, with those of the existing pattern, be attached to the Proceedings,* for general information.

* Enclosed for that purpose to be returned.

3. The Board desire me to observe, that if the Committee think fit to recommend an experimental carriage made of different woods with reduced iron work, and fewer perforations, the Superintendent Gun Carriage Manufactory will be instructed to make up a 6 Pdr. Carriage and Limber, on plans and specifications proposed by the Committee, subject to such alterations as may appear requisite whilst the carriage is under construction, and the Committee will shortly have an opportunity, by personal examination, of selecting from amongst the half wroughts of the various woods at present stored in the Manufactory, those they may think most suitable for the component parts of this Carriage.

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Statement showing the weight of the component parts of the Iron and Brass work of a 12 Pdr. Howitzer Carriage and Limber of the Established pattern, and the Established pattern of reduced dimensions.

No. of the Component parts.	Carriage.	Established pattern.		Established pattern reduced dimensions.		Remarks.
	Iron Work.	lbs.	ozs.	lbs.	ozs.	
1	Axletree,	149	0	132	0	
2	Trunnion and garnish plates,	54	6	35	0	
4	Eye bolts,	15	10½	13	15	
2	Rose head bolts,	6	7½	5	1	
6	Nuts, square 2×¾ inch,	4	5	4	5	
2	Slope Washers,	1	4½	1	2	
1	Hook nut,	1	5	1	4	
2	Countersunk bolts,	2	5½	1	14	
2	Nuts, square 1⅜×½ inch,	0	7	0	7½	
2	Washers round,	0	4	0	4	
2	Cap Squares,	22	10	12	14	
2	Cheek side bolts,	8	½	7	9	
2	Nuts, square 1⅞×¾ inch,	1	4	1	1	
4	Washers square,	1	8	1	5	
1	Axletree Case, centre bolt,	3	3½	2	4	
1	Nut, square,	0	11	0	10	
2	Friction plates,	4	9	3	5	
2	„ Plate caps,	1	15½	1	10	
2	Axletree Case, side bands,	52	0	28	0	
2	„ „ hoop „	5	8	4	8	
1	Centre band,	8	5	0	0	
2	Axletree case hoop bands, for fixing Match box,	5	0	3	9	
4	Nuts, round,	0	6½	0	6½	
4	Washers, round,	0	1½	0	1	
2	Linch pins,	1	14½	1	6	
2	Eye washers,	8	10½	8	2	
4	Keys, fore lock with chains,	2	7½	2	1	
2	Chains rivet,	0	9½	0	8½	
4	Staples for ditto.	0	3	0	3	
1	Bucket hook,	0	12	0	12	
2	Hooks Locking chain,	0	10½	0	10	
1	Elevating screw with handle,	12	11	9	13	
4	Bolts countersunk,	2	6	2	2	
4	Nuts, 1⅜×½ inch,	0	12½	0	6	
4	Slope Washers,	0	13	0	11½	
	Carried forward...	382	7½	289	2	

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No. of the Component parts.	CARRIAGE.	Established pattern.		Established pattern reduced dimensions.		Remarks.
		lbs.	ozs.	lbs.	ozs.	
	Brought forward...	382	7½	289	2	
24	Bolts, triangular for Brass Naves,	20	1½	17	3½	
24	Nuts, for ditto.....	4	10½	4	7	
1	Trail plate with Pintle eye,.....	40	12	36	8	
1	Knuckle bolt,.....	2	4½	2	2	
1	Square head Trail bolt,.....	1	15	1	13	
1	Trail Eye bolt,.....	1	5	1	5	
1	Nut for ditto.	0	8	0	8	
1	Handspike,.....	18	2	15	3	
1	„ Stopper,.....	3	1	2	13½	
1	Bolt, rose head,.....	0	7	0	7	
1	Washer, rose head,.....	0	3	0	2½	
1	Pin,.....	0	½	0	¼	
2	Trail handles,.....	5	9	4	4	
2	Bolts, rose head for ditto.....	1	10½	1	13	
2	Nuts, square 1×½ inch,.....	0	3	0	7	
2	Locking plates,.....	4	4	3	13	
1	Portfire socket,.....	1	5½	1	1	
1	Hurter plate, Handspike,.....	0	5	0	5	
1	Hoop for Spunge head,.....	0	10	0	10	
1	Portfire Clipper with plates,...	3	4	2	11	
2	Buckles, large,.....	0	2	0	2	
3	„ small,.....	0	2	0	1½	
1	Locking chain,.....	18	10	18	0	
4	Staples for straps, large,.....	0	1⅓	0	1½	
6	„ „ „ small,.....	0	1⅓	0	1½	
2	Tires,.....	164	0	164	0	
12	Tire nails,.....	1	6	0	14	
2	Securing clamps for Match and Shot box,.....	1	15	1	10	
16	Clamps for Match and Shot box,	4	2⅔	2	10	
4	Hinges for Match and Shot box,	3	12	2	15	
2	Hasps and 2 Staples for ditto.	1	8½	0	14½	
1	Plate Match box cover,.....	0	4	0	4	
	BRASS WORK.					
1	Elevating Screw box,.....	15	4⅓	12	4	
2	Naves,.....	158	8	134	12½	
	Total..	862	14	725	5¼	

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No. of the Component parts.	Limber.	Established pattern.		Established pattern reduced dimensions.		Remarks.
	Iron Work.	lbs.	ozs.	lbs.	ozs.	
1	Axletree,.....	149	0	126	0	
1	Pintle hook,.....	40	5	29	9	
3	Bolts square head, countersunk long,.....	3	0	0	0	
2	„ „ „ „ „ ..	0	0	2	1	
2	„ „ „ „ short,...	1	$\frac{1}{2}$	0	0	
1	„ „ „ „ „ ..	0	0	0	6	
4	Nuts, square 2 × $\frac{5}{8}$ inch, ...	2	11	0	0	
2	„ „ 2 × $\frac{5}{8}$ „	0	0	1	6	
1	Nut, $1\frac{1}{2}$ × $\frac{1}{2}$ inch,.....	0	5	0	5	
1	Axletree case centre band,.....	13	9	8	10	
2	Stays,.....	20	1	11	$3\frac{1}{2}$	
2	Axletree case bands,.....	5	10	4	$9\frac{1}{2}$	
4	Nuts, square $1\frac{1}{2}$ × $\frac{1}{2}$ inch,.....	0	14	1	0	
4	Stopping plates, ...	2	8	1	5	
2	Bolts countersunk,.....	0	$7\frac{1}{2}$	0	4	
2	Nuts, square 1 × $\frac{3}{8}$ inch, ...	0	3	0	3	
2	Washers, round,.....	0	$1\frac{1}{2}$	0	$1\frac{1}{2}$	
1	Suspending band for grease box,	3	12	3	2	
2	Eye plates,.....	4	12	2	10	
4	Bolts for Eye plates countersunk,	3	0	2	0	
4	Nuts, square $1\frac{1}{4}$ × $\frac{1}{2}$ inch,.....	0	12	0	$8\frac{1}{2}$	
2	Friction plates,.....	5	0	4	5	
2	„ plate caps,.....	1	14	1	10	
4	Lashing rings,.....	1	3	0	10	
1	Splinter bar hoop and double eye plate,.....	6	11	4	14	
2	Rose head bolts for do.....	0	15	0	12	
2	Nuts, square $1\frac{1}{4}$ × $\frac{1}{2}$ inch, ...	0	6	0	4	
2	Splinter bar hoop and eye,.....	7	5	5	3	
2	Countersunk bolts for hoop and eye,.....	0	10	0	$5\frac{1}{2}$	
2	Nuts, square 1 × $\frac{3}{8}$ inch, ...	0	3	0	3	
2	Bolts rose head large for lashing bar,.....	1	14	1	$1\frac{1}{2}$	
2	„ „ „ small for do.					
2	Nuts, square $1\frac{1}{4}$ × $\frac{1}{2}$ inch for do.	0	6	0	0	
2	„ „ 1 × $\frac{5}{8}$ „ for do.	0	$3\frac{1}{2}$	0	0	
4	„ „ 1 × $\frac{3}{8}$ „ for do.	0	0	0	$5\frac{1}{2}$	
4	Washers round,.....	0	4	0	$2\frac{1}{2}$	
2	Thumb pins,.....					
2	Oblong Washers for Thumb pins,.....	0	11	0	12	
	Carried forward...	279	9	215	12	

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No. of the Component parts.	Limber.	Established pattern.		Established pattern reduced dimensions.		Remarks.
		lbs.	ozs.	lbs.	ozs.	
	Brought forward..	279	9	215	12	
2	Linch pins,.....	1	14	1	5	
2	Eye Washers,.....	8	8	7	14	
2	Tires,.....	164	0	164	0	
12	Tire Nails,.....	1	6	0	14	
1	Pole Band, ...	4	1	3	4½	
1	Pole hoop and ring,.....	2	12	2	4	
1	Pole embracing plate with stud,	7	14	4	9	
1	Pole nose cap,.....	5	11	4	9	
2	Bolts for do.	0	12	0	12	
2	Nuts for do.	0	3	0	3	
1	Key,.....	0	½	0	½	
1	Hook and chain for pole rest,...	0	3	0	3	
1	Pole rest furniture,.....	0	14	0	14	
1	Stopping pin and chain for pole,	1	8	1	8	
1	Key and chain for stopping pin,	0	6¼	0	4½	
2	Square washers for pole,.....	0	3	0	3	
1	Oblong washer for pole pin,....	0	3	0	3	
1	Pintle hook, key and chain,....	2	0	1	10½	
2	Securing plates or bands,.....	1	8	1	0	
1	Clip band and Swivel,.....	5	8½	5	3½	
1	Pole Bar,.....	12	11	12	12	
1	Pole Bar Swivel,.....	3	0	2	12	
1	Wrench,.....	8	10	8	10	
1	Scraper,.....	0	11	0	12	
1	Linking or Collar chain,..	2	6½	2	6	
4	Staples,.....	0	1	0	1	
2	Buckles, ...	0	1½	0	1	
4	Limber box handles,.....	22	1	16	10	
4	Bolts, square head,.....	0	10	0	10	
4	Nuts, square 1 × ⅜ inch,.....	0	6	0	6	
2	Limber box hasps complete,...	3	10½	3	1½	
2	Staples for hasps,.....					
4	Limber box hinges complete,. ...	6	6	4	4½	
24	„ „ clamps,.....	12	0	8	2½	
2	Hurter clamps,.....	0	7	0	6	
2	Eye plates lashing,.....	1	0	0	10	
2	Securing clamps for Limber box straps,.....	2	1	1	4½	
8	Staples for Limber box straps,...	0	2½	0	2½	
4	Buckles for ditto.	0	3	0	2	
2	Store box handles,.....	4	8	3	7	
2	Bolts,.....	0	3	0	3	
2	Nuts, ¾ × 5/16 inch,.....	0	1½	0	1½	
	Carried forward..	570	4¾	483	5½	

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No. of the Component parts.	Limber.	Established pattern.		Established pattern reduced dimensions.		Remarks.
		lbs.	ozs.	lbs.	ozs.	
	Brought forward...	570	4¾	483	5½	
2	Washers round, ...	0	1	0	1½	
1	Hasp for Store box complete,. }	0	11½	0	9	
1	Staple for do. ..... }					
2	Hinges for do.	1	12	1	5½	
12	Store box clamps,.....	3	11½	3	0	
2	Hinges for Grease box,.....	0	11½	0	8	
1	Hasp for do. .. ... }	0	8½	0	6	
1	Staple for do. ..... }					
2	Clamps for do.	0	10	0	11	
24	Bolts, nave,.....	20	1	17	9	
24	Nuts, „	4	10½	4	5	
	Brass Work.					
2	Naves,.....	158	8	134	12½	
	Total...	761	10¼	646	9	

ARTICLE 581.

Gun Traversing Platform proposed by Serjeant Instructor Bowman.

(a) No. 3119, 21st June 1850.

The Military Board call(a) for an opinion on an alteration in General Cullen's pattern of Gun Traversing Platform proposed by Serjeant Instructor Bowman, a model of a Platform of the above pattern and also one altered as proposed having been forwarded for the inspection of the Committee.

Opinion.—The Committee see no adequate advantage to be obtained by altering the existing pattern of Gun Traversing Platform which has been found to answer perfectly well. Although the proposed platform is lighter, it would no longer be so, by the additional centre sleeper which appears to be indispensible, and has, in fact, been adopted by the Royal Artillery.

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2. In the proposed platform, the Committee further observe that, when traversed to the extreme right or left, the side piece is nearly thrown off the end of the front sleeper.

MINUTE BY CAPTAIN MAITLAND.

I dissent altogether from the opinion of the Committee.

The alteration suggested by Serjeant Bowman in the existing pattern Platform is considered by the Royal Artillery an improvement, and I beg to record my opinion that the principle of construction, making a compact frame, is much superior to the parallel ruler fashion; it is stronger, and the platform will traverse easier.

I do not think the cheeks will be "nearly thrown off the sleepers" when the Platform is traversed, nor do I think that the additional sleeper will add above a few pounds to the entire weight of the present pattern.

GUN CARRIAGE MANUFY., MADRAS, 14*th Sept.* 1850. } (Signed) J. MAITLAND, Capt., *Supt. Gun Carriage Manufy.*

Letter No. 5464, *from the Secretary Military Board, to the Brigadier Commandant of Artillery, dated* 24*th September*, 1850.

In reference to the Report of the Artillery Select Committee in Article 581 of Meeting 162, I am desired to state, that the Military Board see no advantage to be gained in the alteration to General Cullen's Platform, and which the Superintendent of the Gun Carriage Manufactory represented to the Board to be the invention of Serjeant Instructor Bowman, whereas it now appears, by the Superintendent's Minute attached to the Proceedings, that it is not an invention of Serjeant Bowman's, but merely borrowed by him from the Royal Artillery.

ARTICLE 582.

EXPERIMENTAL CARRIAGE FOR ALL LIGHT FIELD ORDNANCE, PROPOSED BY MAJOR P. ANSTRUTHER, C. B., FITTED WITH CHEEKS FOR A 12 PDR. HOWITZER. VIDE MEETING 159, ARTICLE 552.*

The Carriage having undergone Proof with a 12 Pdr. Howitzer, the Proof Reports are laid before the Committee.

OPINION.—The Committee recommend that the Carriage be sent down to the Gun Carriage Manufactory to have iron cheeks for the 24 Pdr. Howitzer and 9 Pdr. Gun adapted to it, in order to complete the series of experiments.

* Page 10.

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Table showing a comparison between Major Anstruther's Experimental Carriage for all Light Field Ordnance, before and after alteration, as recommended by the Permanent Artillery Select Committee, in Meeting 157, *Article* 533, *and that of the Artillery Select Committee Pattern.*

		12 Pounder Howitzer Carriage.		
		Artillery Select Committee.	Major Anstruther's originally.	Major Anstruther's after alteration.
1. Axis of the Bore from the ground, P. B.	inches	49	36½	36½
2. Angle of Trail,	degrees	18½	14½	14½
3. Length of Trail from rear of Axletree Bed to where it touches the ground,	inches	97½	90	90
4. Length of Axle from shoulder to shoulder,	inches	44	34	34
5. Weight required to raise the Trail one inch from the ground,	lbs.	214	199	150
6. Weight of Carriage,	cwt.	12-0-26	11-2-21	10-1-25
7. Weight required to raise the Trail off a prop 26 inches high, as for limbering up,	lbs.	170	182	140
8. Weight required to raise the Pole off a prop 41 inches high, the height when in draught,	,,	44	45⅓	58
9. The centre of trunnions with reference to the centre of axle-tree, when the trail is on the ground, how much in front of, ascertained by dropping a perpendicular from the centre of the trunnions and marking where that line cuts the centre of axle-tree,		Centre of trunnions ·5 in front of centre of axle-tree.	Centre of trunnions and centre of axle-tree in one vertical line.	Centre of trunnions 4· in front of centre of axle-tree.

Artillery Depôt,
Saint Thomas' Mount,
6th *September*, 1850.

(Signed) P. J. BEGBIE, Major,
Acting Director Artillery Depôt.

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Letter No. 5479, *from the Secretary Military Board, Fort St. George, to the Brigadier Commandant of Artillery, dated* 24*th September*, 1850.

I am desired to acquaint you that the Military Board have ordered the Superintendent of Gun Carriage Manufactory to complete Major Anstruther's Experimental Carriage for all calibres, by preparing with all possible expedition the Iron cheeks for the 24 Pdr. Howitzer and 9 Pdr. Gun, with a view to allow the Select Committee to decide on this useful Carriage at an early date, as recommended in Article 582 of Meeting 162.

You are requested to order the Carriage to be sent to the Manufactory.

ARTICLE 583.

WAGGON AND LIMBER OF THE SELECT COMMITTEE PATTERN BUILT WITH PEDDOWK WOOD. VIDE MEETING 161, ARTICLE 579, PAGE 75.

Weight of the Waggon body with wheels.....					Cwt.	11	0 8
„	„	Limber,	„	„	„	9	3 20

Letter No. 4284, *from the Secretary Military Board, to the Brigadier Commandant of Artillery, dated* 13*th August* 1850.

Board's No. 12396.

I have the honor to forward the enclosed original letter from the Superintendent of the Gun Carriage Manufactory, No. 429, of date 9th July 1850, with 4 Drawings connected with the Experimental Peddowk Waggon and Limber (sent to the Mount) and to request you will bring this Waggon and Limber before the Permanent Artillery Select Committee in continuation of the Proceedings in Meeting 161, Article 579.

2. The Board request that their letter to your address No. 2526 of 28th May 1850, and the Superintendent's letter* (and 3 Statements,) No. 385, of date 26th June 1850, may form part of the Committee's Proceedings.

* Board's No. 11524.

3. The Board desire me to observe, that this Experimental Waggon and Limber is not yet brought down to the weight of a Waggon and Limber constructed in 1834, viz., No. 42,

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Waggon and Limber of Cullen's Pattern, which is now at the Field Train or Manufactory weighing 2340 lbs. whilst the Experimental Peddowk Waggon weighs 2380 lbs. and even this weight has only been obtained by important changes in the scantling and dimensions, as compared with those of the Artillery Select Committee Pattern Waggon and Limber No. 40 constructed in 1849, which weighs 3105 lbs. owing chiefly to the use of Saul instead of Teak wood.

4. The Board have approved and encouraged every attempt to diminish the weights of our very heavy Carriages, but it will be for the Committee carefully to consider, whether the advantage yet gained by the construction of the Experimental Waggon and Limber is sufficiently great, to justify the departure therein made from the established patterns, and whether these changes might not be effected in Teak, as well as in Peddowk, also whether the diminution of weight is owing to the iron, rather than to the wood, work, when the latter is composed of Teak, and not of Saul, wood.

Extract from Letter No. 429, *from the Superintendent Gun Carriage Manufactory, to the Secretary Military Board, dated 9th July,* 1850.

In reporting the completion of the 12 Pdr. Howitzer Ammunition Waggon body of reduced dimensions, ordered in your letter No. 2781 of the 4th ultimo, I have the honor to forward drawings* showing the dimensions and weight of the several component parts, also the dimensions of the component parts of a Waggon of the established pattern.

* Four.

The advantage this Waggon has in weight over that of the established pattern and Colonel Cullen's pattern are as follows :

12 Pounder Howitzer Waggon reduced dimensions of Peddowk wood.

	lbs.	ozs.	
Body, - - - - -	394	12	
4 Ammunition Boxes with Copper Boxes, - -	308	0	Not made, but the weights would be the same as those for the 12 Pdr. Howitzer Peddowk Limber of reduced dimensions.
2 Under Boxes, - -	21	12	
1 Locking Chain, - -	16	11	

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	lbs.	ozs.	
1 Handspike, - -	8	12	
1 Prop, Wheel, - -	2	8	
2 Wheels, - - -	512	0	Not made, but the weights would be the same as those for the 12 Pdr. Howitzer Limber of Peddowk wood reduced dimensions.
	1264	7	

12 Pounder Howitzer Waggon A. S. C. P. of Saul and Teak wood.

	Saul. lbs.	Saul. oz.	Teak. lbs.	Teak. oz.
Body, - - - - - - -	704	0	564	13
4 Ammunition Boxes with Copper Boxes,	352	0	352	0
2 Under Boxes, - - - - -	23	12	23	12
1 Locking Chain, - - - - -	16	11	16	11
1 Handspike, - - - - -	8	12	8	12
1 Prop Wheel, - - - - - -	3	0	3	0
2 Wheels, - - - - - -	574	0	508	0
	1682	3	1477	0

12 Pounder Howitzer Waggon Colonel Cullen's Pattern of Teak wood.

	lbs.	ozs.
Body, - - - - - - - - - -	424	0
3 Ammunition Boxes with Copper Boxes, - -	290	0
2 Wheels, - - - - - - - -	523	0
	1237	0

which shows a difference between the Peddowk and Saul wood Waggon of $417\frac{3}{4}$ lbs. between the Peddowk and Teak wood Waggon of $212\frac{9}{16}$ lbs. and between the Peddowk and Teak wood Waggon of Colonel Cullen's pattern of $27\frac{7}{16}$ lbs. the two former comparisons being in favor of Peddowk wood, and the latter against it.

But it must be borne in mind that the established Pattern Waggon is made for 4 Ammunition Boxes, upon which 4 Gunners are intended to be carried, while that of Colonel Cullen's pattern has only 3 Boxes, and that it has 2 Under boxes, a Locking Chain, a Handspike, and a Wheel Prop which Colonel Cullen's pattern has not, moreover it is made to carry a spare wheel, which the other does not carry, for which there is the additional weight of the block.

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Statement showing the weight of the Component parts of a 12 Pounder Howitzer Ammunition Waggon, Colonel Cullen's Pattern.

No. of the Component parts.	Names of the Component parts.	Weight. lbs.	Weight. oz.	Remarks.
	IRON WORK.			
1	Axletree,	119	0	
2	Eye washers,	8	12	
2	Linch pins,	1	10	
2	Friction plates with Caps,	6	15	
2	Axletree hoops,	7	12	
1	Trail plate with pintle eye,	35	0	
1	Eye bolt,	1	3	
1	Nut, square,	0	5	
1	Bolt, countersunk,	0	12½	
1	Nut square,	0	5½	
1	Socket pole rest with bolt,	2	3	
1	Nut, octagonal,	0	3½	
2	Bands, Axletree side,	10	7	
1	Do. Centre,	18	4	
1	Do. Cross,	3	10	
2	Bolts, square head,	0	15	
2	Nuts, square,	0	11½	
6	Bolts, eye,	3	3	
6	Nuts, square,	2	1½	
4	Washers, slope,	0	11	
2	Bolts, rose head,	1	11½	
2	Nuts, square,	0	12	
2	Plates, stopper,	0	14	
5	Bolts, square head,	3	2½	
5	Nuts, square,	1	14	
2	Resting plates,	16	9	
2	Bolts, square head,	0	10	
2	Nuts, square,	0	3½	
2	Bolts, countersunk,	0	14	
2	Nuts, square,	0	3½	
2	Washers,	0	1	
1	Hoop pole rest,	0	5	
1	Pin do.	0	9	
1	Hook with ring do.	0	1	
2	Rivets,	0	½	
2	Hooks, bucket,	0	4½	
10	Lashing rings,	2	½	
	Carried forward...	254	4	

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No. of the Component parts.	Names of the Component parts.	Weight. lbs.	Weight. oz.	Remarks.
	Brought forward...	254	4	
1	Band, Tar barrel,.	3	6	
1	Plate,.....	1	8	
4	Bolts, round head,.....	0	12½	
4	Nuts, square,.....	0	8½	
6	Keys with chains,.....	1	6	
2	Plates, locking, ...	2	9	
1	Chain, locking,.....	17	5	
32	Screws,.....	0	8½	
*2	Wheels complete,.....	50[illegible]	0	
	3 AMMUNITION BOXES.			
6	Hinges,.....	10	14	
3	Hasps with staples,.....	3	9	
9	Rivets, Iron,.....	0	6	
6	Clamps, large with rings,.....	14	0	
12	Clamps, small,.....	4	8	
6	Handles,.....	6	12	
78	Screws,.....	0	10½	
14	Rivets, Copper,.....	0	9	
3	Copper Boxes.....	28	2	
	Total lbs..	853	10	
	WOOD WORK WITHOUT WHEELS.*			
1	Axle Case,.....	32	10	Teak Wood.
1	Perch,.....	42	0	
2	Side frames,.....	23	11	
2	End „	17	0	
1	Stand for Tar barrel, ...	5	12	
1	Pole rest,.....	2	4	
3	Ammunition Boxes,.....	214	0	
	Total lbs...	337	5	
	Grand Total..	1190	15	

GUN CARRIAGE MANUFACTORY,
Madras, 26th June, 1850.

(Signed) J. MAITLAND, Captain,
Superintendent Gun Carriage Manufactory.

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Statement showing the weight of the Component parts of a 12 Pounder Howitzer Ammunition Waggon A. S. C. P.

No. of the Component parts.	Names of the Component parts.	Weight. lbs.	Weight. oz.	Remarks.
	IRON WORK.			
1	Axletree,	143	0	
2	Eye washers,	8	15	
2	Linch pins,	1	9	
2	Friction plates with caps,	6	12	
2	Bands, side,	25	1	
1	,, centre,	11	3	
2	Bolts, oblong long,	2	12	
2	Nuts, square,	0	13	
4	Bolts, oblong short,	4	2	
4	Nuts, square,	1	10	
4	Bolts, rose head side framing,	3	8½	
4	Nuts, square,	1	2	
4	Washers, round,	0	6	
8	Bolts, rose head foot board,	5	10½	
8	Nuts, square,	2	5½	
8	Washers, round,	0	11	
2	Bolts, round head long,	1	13½	
2	,, ,, ,, short,	1	7	
4	Nuts, square,	1	2½	
2	Washers, round,	0	2½	
4	Plates, stopper,	2	8½	
4	Bolts, countersunk,	1	0	
4	Nuts, square,	0	5	
4	Washers, round,	0	3½	
2	Handles, trail,	4	9	
2	Bolts, rose head,	1	3½	
2	Nuts, square,	0	3	
2	Bolts, wheel rest,	3	6	
2	Nuts, square,	0	9	
2	Washers, round,	0	3	
1	Bolt, eye for frame,	2	5½	
1	Nut, octagonal,	0	3	
1	Washer,	0	1½	
1	Plate, bottom,	1	10½	
8	Rings, lashing,	2	14	
1	Hook, bucket,	0	4½	
1	Plate, trail with pintle eye,	37	0	
1	Bolt, eye trail,	2	1½	
	Carried forward...	284	13	

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No. of the Component parts.	Names of the Component parts.	Weight. lbs.	Weight. oz.	Remarks.
	Brought forward...	284	13	
1	Nut, square,....	0	10	
1	Bolt, rose head,....	0	14	
1	Nut, square,....	0	5½	
1	Plate, stopping,....	0	12½	
4	Securing Bands,....	2	14	
2	Plates, locking,....	2	13	
1	Plate, wheel rest,....	0	13	
2	Bands, suspending,....	8	15	
2	Hasps, with staples,....	1	11	
12	Staples,....	0	2½	
6	Buckles,....	0	3	
5	Hooks, locking chain,....	2	1	
1	Chain, locking,....	16	11	
90	Screws,....	1	12½	
*2	Wheels complete,....	574	0	
	4 Ammunition Boxes.			
4	Clamps, securing,....	4	2	
48	Clamps, small,....	23	12	
8	Handles,....	44	8	
8	Bolts, square head,....	1	4	
8	Nuts, square,....	0	11	
8	Hinges complete,....	12	14	
8	Hasps complete,....	7	4	
4	Plates, Eye lashing,....	2	0	
4	Plates, securing hurter clamp,....	0	14	
8	Buckles,....	0	6	
16	Staples,....	0	4	
392	Screws,....	5	0	
	2 Under Boxes.			
4	Hinges,....	2	14	
10	Clamps, large,....	2	8	
4	„ small,....	0	7	
128	Screws,....	0	13	
4	Copper Boxes,....	37	8	
	Total lbs..	1046	8	

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No. of the Component parts.	Names of the Component parts.	Weight. lbs.	Weight. oz.	Remarks.
	Wood Work without Wheels.*			
1	Axle case,.....	46	3	
1	Perch, ...	138	0	
2	Side frames,.....	63	0	
2	End „	25	1	
1	Centre „	14	½	
2	Cross centre frames, large,...	5	9½	
4	„ „ „ small,.....	6	1	Saul wood.
2	Foot boards,.....	43	0	
1	Wheel rest,.....	10	5	
1	Block for Axe,.....	1	2½	
1	Do. for Pick Axe,...	0	13	
1	Do. for Pole rest,.....	0	1½	
1	Pole rest,.....	2	15½	
4	Ammunition Boxes,.....	188	0	Teak wood.
2	Under Boxes,.....	17	2	
	Total lbs....	561	6½	
	Grand Total.	1607	14½	

Gun Carriage Manufactory,
Madras, 26th June, 1850.

(Signed) J. Maitland, Captain,
Superintendent Gun Carriage Manufactory.

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Statement showing the Weight of the Component parts of a 12 Pounder Howitzer Waggon of Peddowk Wood of reduced Dimensions.

No. of the Component parts.	Names of the Component parts.	Weight. lbs.	Weight. ozs.	Remarks.
	IRON WORK.			
1	Axletree,	126	0	
2	Eye washers,	7	14	
2	Linch pins,	1	5	
2	Friction plates with Caps,	4	0	
2	Bands, side,	8	5	
1	„ Centre,	3	8½	
2	Bolts, oblong long,	0	13	
2	Nuts, square,	0	6	
4	Bolts, oblong short,	1	4	
4	Nuts, square,	0	12	
4	Bolts, rose head side framing,	2	2½	
4	Nuts, square,	0	5½	
4	Washers, round,	0	3½	
1	Bolt, round head long,	0	7	
1	„ „ „ short,	0	5	
2	Nuts, square,	0	3	
2	Washers, round,	0	1½	
4	Plates, stopper,	0	15	
2	Handles, trail,	4	0	
2	Bolts, rose head,	0	13½	
2	Nuts, square,	0	2½	
2	Bolts, wheel rest,	2	0	
2	Nuts, square,	0	2½	
2	Washers, round,	0	1½	
1	Bolt, eye for frame,	1	0	
1	Nut, octagonal,	0	1½	
1	Washer, round,	0	½	
8	Rings, lashing,	1	4	
1	Hook, bucket,	0	1	
1	Plate, trail with Pintle eye,	27	4	
1	Rivet washer,	0	4	
1	Bolt, eye trail,	0	9	
1	Nut, square,	0	2	
1	Bolt, rose head,	0	7	
1	Nut, square,	0	2	
1	Plate, stopping,	0	5	
4	Plates, for securing clamps,	0	3½	
2	Plates, locking,	1	0	
1	Plate, wheel rest,	0	15	
	Carried over	199	13	

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No. of the Component parts.	Names of the Component parts.	Weight. lbs.	Weight. ozs.	Remarks.
	Brought forward..	199	13	
2	Bands, suspending,..	4	15	
2	Hasps, with staples.....	1	4	
12	Staples,.....	0	2	
6	Buckles,.	0	2	
1	Chain, locking, ...	16	11	
5	Hooks, locking chain,.....	0	10½	
2	Tires,.....	162	0	
12	Nails, tire,.....	0	14	
24	Bolts, nave,.....	17	3	
24	Nuts, ,, ...	4	7	
90	Screws,.....	1	10½	
	4 AMMUNITION BOXES.			
8	Hinges, complete,...	8	9	
4	Hasps, ,, ...	6	0	
48	Clamps,.....	16	5	
4	Eye plates,.....	1	5	
4	Plates, securing,.....	0	11½	
8	Handles, side,.....	31	12	
8	Bolts, square head,.....	1	0	
8	Nuts, square,.....	0	10	
16	Staples,.....	0	5½	
8	Buckles,.....	0	4	
4	Clamps, securing,.....	2	9	
384	Screws,.....	4	13½	
	2 UNDER BOXES.			
4	Hinges, complete,.....	1	8	
2	Hasps, ,, ...	0	10	
10	Clamps, large,.....	2	10½	
4	,, small,.....	0	7	
134	Screws,.....	0	9	
	BRASS WORK.			
2	Naves,.....	117	4	
	COPPER WORK.			
4	Boxes,.....	27	7	
360	Tacks,.....	0	5½	
76	Brads,.....	0	1½	
	Carried over...	634	15	

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No. of the Component parts.	Names of the Component parts.	Weight. lbs.	Weight. ozs.	Remarks.
	Brought forward..	634	15	
20	Rivets,.....	1	13	
8	Plates, small,.....	0	4	
	Wood Work.			
1	Axletree Case,.....	32	14	Peddowk wood.
1	Perch,.....	58	0	
2	Side frames,.....	32	14	
2	End frames,.....	15	13	
2	Foot boards,.....	9	9	
1	Centre frame,.....	4	5	
2	Cross centre frame, large,.....	2	11	
4	„ „ „ small,.....	4	9	
1	Wheel rest or Saddle block,.....	7	4	
2	Blocks for wheel rest or saddle block,	0	9	
1	Block for Axe rest,.....	0	14	
1	„ „ Pick axe rest,.....	0	10	
1	„ „ Pole rest,.....	1	1	
1	Pole rest,.....	2	8	
1	Handspike,.....	8	12	
4	Ammunition Boxes,.....	211	0	Pegue Teak.
2	Under Boxes,.....	18	0	
24	Spokes,.....	194	4	Peddowk.
12	Felloes,.....			
	Total...	1242	9	

	Cwt.	Qrs.	lbs.
Total weight of Body, - -	6	2	23
Total weight of 2 Wheels, - -	4	1	13
Total...	11	0	18

Gun Carriage Manufactory,
Madras, 5th September, 1850.

(Signed) J. Maitland, Captain,
Supt. Gun Carriage Manufactory.

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Letter No. 2526, from the Secretary Military Board, to the Brigadier Commandant of Artillery, dated 28th May, 1850.

The Military Board are anxious you should take into special consideration the yearly increasing weight of our Ordnance Carriages with a view to suggesting such measures as may appear to you best calculated to check, if not to remedy, the injury which this may occasion to the Corps.

2. From the imperfect Registers in the Board's possession, the following are the comparative weights of the Carriages now at St. Thomas' Mount, or in the Manufactory undergoing repair.

6 Pounder Gun Carriage and Limber.

Year of Construction.	No.	Weight in Cwt.	Qrs.	lbs.	Weight in lbs.
1828	1	20	2	11	2307
1830	110	21	1	17	2397
1832	13	—	—	—	—
1834	40	21	2	10	2418
1836	61	20	3	6	2326
1837	66	21	0	5	2357
1838	76	22	1	1	2493
1842	4	24	2	23	2767
1844	4	23	1	6	2610
1845	1	23	2	6	2638
1848	5	25	3	7	2891
1849	13	25	2	0	2856

9 Pounder Gun Carriage and Limber.

1835	13	22	2	11	2531
1838	30	23	1	4	2608
1839	32	23	3	1	2661
1840	54	22	1	27	2519
1840	1	23	0	18	2594
1840	2	23	0	19	2595
1842	11	25	3	10	2866
1844	1	23	3	26	2658
1848	1	24	2	22	2766
1849	2	26	0	17	2929

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12 Pounder Howitzer Carriage and Limber.

Year of Construction.	No.	Weight in Cwt.	Qrs.	lbs.	Weight in lbs.
1838	11	22	1	14	2506
1839	16	22	1	20	2512
1848	2	25	0	14	2814
1849	12	26	1	24	2964

24 Pounder Howitzer Carriage and Limber.

1841	11	25	2	25	2875
1842	29	26	3	26	3022
1848	1	23	3	8	2668
1849	7	26	3	14	3010

Ammunition Waggons.

1834	42	20	3	16	2452
1839	100	24	0	11	2699
1840	112	21	0	24	2376
1843	9	23	2	26	2648
1846	78	24	0	18	2706
1846	1	25	0	22	2822
1848	8	27	3	0	3108
1849	40	27	2	25	3105

According to the above a 6 Pdr. Battery of 6 Guns and 6 Waggons is now about 7000 lbs. heavier than a Battery of the same Calibre was a few years since, so that a Battery of 6 pieces is now of the same weight as one of 8 pieces formerly.

OPINION.—The Committee would recommend the Experimental Waggon of Peddowk wood to be sent to Nagpore along with the Carriage constructed of the same description of Timber, that it be there made over to the Horse Artillery at Kamptee for one year, then returned to the Mount to be reported upon.

2.—The remarks upon the Peddowk Carriage in Article 580 of this Meeting may generally be equally applied to the Waggon.

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MINUTE BY LIEUT. COLONEL ALCOCK.

I dissent from the opinion given by the majority, for the reasons recorded in my dissent from the opinion of the Committee on Article 580 of this Meeting, remarking that if Peddowk wood is objectionable for Gun Carriages, what can be the use of trying it; for the Iron work adapted to it, whether reduced or otherwise, may not be suited to Teak Carriages, and to Teak, I feel assured the Manufacturer will be constrained to return at last!

(Signed) G. ALCOCK, Lieut. Colonel,
2d Battalion Artillery.

Letter No. 5895, *from the Secretary Military Board, to the Brigadier Commandant of Artillery, dated* 18*th October*, 1850.

The Ammunition Waggon and Limber, reported on by the Artillery Select Committee in Article 583, of Meeting 162, having been constructed with a view to ascertain the possibility of employing the heavy Peddowk, in supersession of Teak wood, the Military Board desire me to observe, that the end, if attained, has been arrived at, by reduction of dimension of some of the *iron* component parts not by reduced scantling of timber only.

2. Hence the present experiment does not really decide the question, for it is not a comparison of the two woods, if the smaller iron is admissible with Peddowk, it seems likely that it would be sufficient for Teak, the Board would wish to know your opinion on this point, and that of the Select Artillery Committee.

3. The Board request to be favored with a detailed Statement of the reductions in iron, with (as nearly as the Committee feel themselves safe in giving) an opinion on each reduction, as now applied to Peddowk, and as applicable in future to Teak.

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ARTICLE 584.

Experimental Mortar Cart proposed by Captain J. Maitland, Superintendent Gun Carriage Manufactory.

The Military Board direct[a] that an Experimental Mortar Cart proposed for General Service by the Superintendent Gun Carriage Manufactory, be submitted for the Report of the Permanent Artillery Select Committee.

[a] No. 4340, 16th Aug. 1850.

The following Documents are laid before the Committee.

1. *Two Reports on the Experimental Mortar Cart, from the Superintendent Gun Carriage Manufactory, to the Secretary Military Board.*[b]

[b] No. 500, 2d Aug. 1850. No. 523, 12th Aug. 1850.

2. *Two Drawings of the Mortar Cart.* (Plates 25 and 26.)

3. *Letter from the Secretary Military Board, to the Brigadier Commandant of Artillery.*[c]

[c] No. 4611, 27th Aug. 1850.

Opinion.—The Experimental Mortar Cart with an 8 Inch Mortar and Bed was taken to the foot of the road up the slope of the Mount with six bullocks in single yoke, and ascended a few yards, when it became necessary to add another pair of leaders: at the second slope an additional pair were yoked on, when they crowned the slope, and it was afterwards lowered by hand. With ten bullocks in two quadruple yokes and one single one, with a 10 Inch Mortar and Bed, it proceeded a short circuit on the Cantonment roads apparently with ease.

2. The axle-tree should be placed, as in the old muster cart, nearer to the centre of the cart, and much strengthened by giving greater depth.

3. The Committee, however, doubt whether the axle-tree be sufficiently strong, and whether there be not too much play on the pole, as also, whether the diminution of the width of the tire from 4½ inches to 3 inches may not operate

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injuriously by cutting deeply into the common roads of the country, and recommend a severer and more continuous trial, say the distance of an ordinary march over the roads of the country.

4. With reference to Para. 2 of the Board's letter No. 4611 there appears to be a misapprehension regarding the weight that can be carried on a single pair of wheels, for the allowance for a heavy Mortar Cart is one 10 Inch Iron Mortar and Bed weighing cwts. 37 1 11, or two 8 Inch Mortars and Beds weighing together cwts. 39 1 16.

MINUTE BY LIEUT. COLONEL ALCOCK.

I dissent, and object to any further experiment in this case, concurring in all the doubts expressed by the Committee. I consider the Platform Cart preferable to this heavy description of Carriage which no ordinary cattle could transport through a difficult country with a 10 Inch Mortar and Bed.

(Signed) G. ALCOCK, Lieut. Col.,
2d Battalion Artillery.

MINUTE BY CAPTAIN MAITLAND.

As Lieut. Colonel Alcock has stated his objections to the Platform and Cart I have proposed, I meet his objections by giving the weight of the different Mortar Platform Carts; the loads they are expected to carry through every description of country, is given in the 4th para. of the Committee's Proceedings.

	lbs.
Heavy Mortar Cart, - - - -	2081
Light, „ „ - - - - -	1223
Captain Maitland's Pattern Mortar Cart, - - - - - -	1670

The Committee have only expressed doubts, as stated by Colonel Alcock, it remains to be proved if these doubts are imaginary or not.

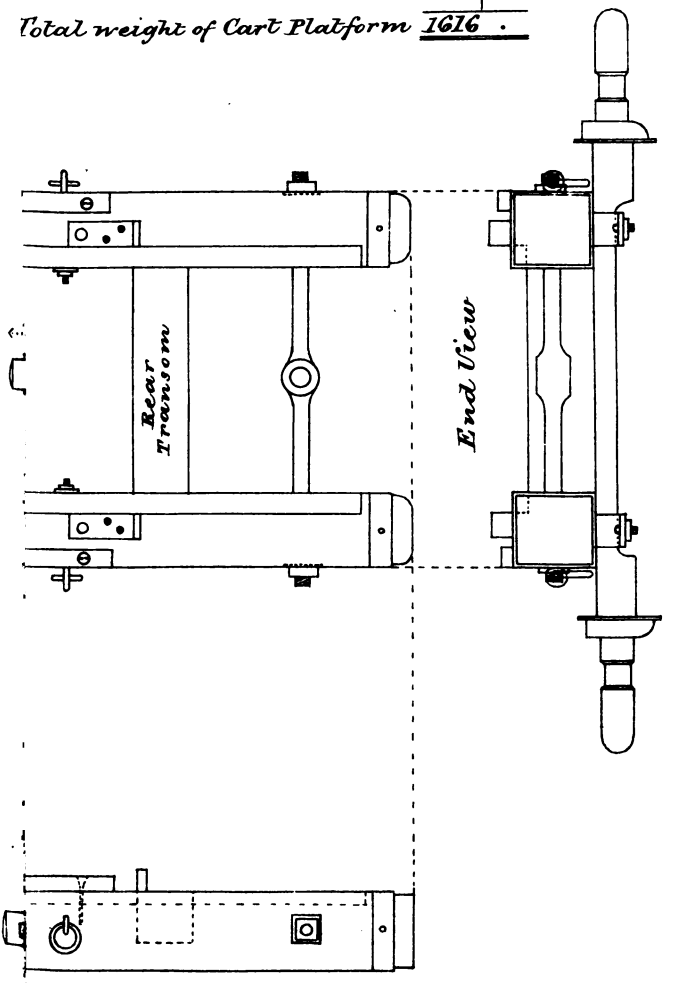
GUN CARRIAGE MANUFY., MADRAS, 14*th Sept.* 1850.

(Signed) J. MAITLAND, Capt.,
Supt. Gun Carriage Manufy.

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ptain J. Maitland,
ufactory.

	lbs.	oz.
Weight of Body	657	-
" " Pole	74	-
" " Wheels	556	-
" " Front Sleeper	84	-
" " Centre	107	-
" " Rear	138	-
Total weight of Cart Platform	1616	.



5 feet.

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C. B.

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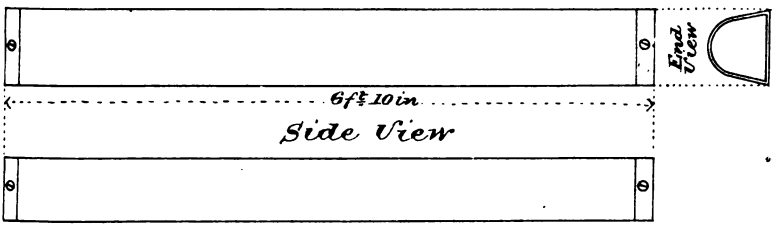
Artillery Select Committee.

Plate 6

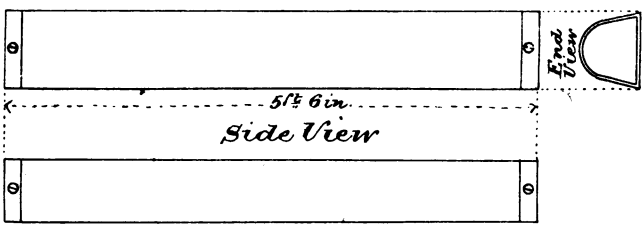
Meeting 162, Article 584.

Sleepers.

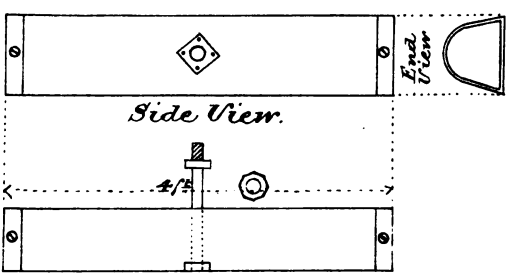
Rear Sleeper.
Plan.



Centre Sleeper.
Plan.



Front Sleeper.
Plan.





Madras Arty Depôt.

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Letter No. 5507, *from the Secretary Military Board, to the Brigadier Commandant of Artillery, dated* 24*th September*, 1850.

I am directed by the Military Board to acknowledge the receipt of Extract from the Proceedings of the Artillery Select Committee No. and date as per margin,* detailing the trial to which the Experimental Mortar Cart proposed by the Superintendent Gun Carriage Manufactory has been subjected.

* Meeting 162, Article 584, dated 6th Sept. 1850.

2. I am instructed to return the Proceedings, and to request you will be good enough to have the Cart put to further trial as suggested by the Select Committee in para. 3 of the Extract under acknowledgment, the Board concurring in opinion, that the merits or demerits of the Cart in question, cannot be correctly ascertained, until subjected to a more severe, and continuous trial, which the Board would wish to be made, by causing the Cart to travel some distance over the country in the neighbourhood of the Mount, and then sending it to the Practice range, to be there tried as a platform; a full report thereon, with the opinion of the Select Committee, being then forwarded to this Department.

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MEETING 163.

EXTRACT FROM THE PROCEEDINGS OF THE PERMANENT ARTILLERY SELECT COMMITTEE, ASSEMBLED BY ORDER OF COLONEL P. MONTGOMERIE, C. B., BRIGADIER COMMANDANT OF ARTILLERY.

Artillery Depôt, Saint Thomas' Mount, 21st September, 1850.

Present.

LIEUT. COL. F. F. WHINYATES, *Principal Commissary of Ordnance.*
LIEUT. COL. P. HAMOND, *Commanding 5th Battalion Artillery.*
LIEUT. COL. H. S. FOORD, *Commanding 4th Battalion Artillery.*
LIEUT. COL. G. ALCOCK, *Commanding 2d Battalion Artillery.*
MAJOR P. J. BEGBIE, *Acting Director Artillery Depôt.*
MAJOR J. W. CROGGAN, *2d Battalion Artillery.*
CAPTAIN T. LAVIE, *Superintendent Gun Powder Manufactory.*
CAPTAIN J. MAITLAND, *Superintendent Gun Carriage Manufactory.*
CAPTAIN B. W. BLACK, *Assistant Adjutant General of Artillery.*

ARTICLE 585.

ON THE ASSIMILATION OF THE AXLES, WHEELS, &C., OF COLONEL CULLEN'S, THE G. O. G., AND ARTILLERY SELECT COMMITTEE PATTERN CARRIAGES.

(a) No. 5021, 11th Sep. 1850.

The Military Board call[a] for the Report of the Artillery Select Committee as to the possibility of altering the axle arms and wheel boxes of Colonel Cullen's pattern Carriages to those of the Artillery Select Committee Pattern, with the view to ensure uniformity of pattern. The Committee are also called upon to report fully upon the following minor alterations, viz.:—Iron handspikes, Cradle for the elevating screw, Semelle to adapt the Carriage to receive the Light or heavy 9 Pdr. Gun.

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Extract from Letter No. 5021, *from the Secretary Military Board, to the Brigadier Commandant of Artillery, dated* 11*th September,* 1850.

2. The Board desire me to observe, that this question is of great importance, as with the present variety of patterns, it is almost impossible in sending wheels or Carriages to different Stations, to know with any certainty, that they will be of the same pattern, as those already in use there.

3. There are 265 Carriages and Limbers 6 Pdrs. 9 Pdrs. 12 Pdr. Howitzer and 24 Pdr. Howitzers in use and in Store, and of these 140 are of Cullen's pattern. Out of 187 Waggons with Limbers there are 75 of Cullen's pattern, but more are believed to be in existence whose patterns have not been reported.

4. If the Wheels, Axles, and Ammunition Boxes of Cullen's pattern, can be assimilated with those of the other patterns, and the axles and wheels of the G. O. G. Pattern, assimilated with those of the other two patterns. The Military Board, consider that these changes, if once effected, will establish greater uniformity in the Ordnance Carriages, than has existed for many years past.

Opinion.—The Committee having carefully examined the 6 Pdr. Gun Carriage Cullen's Pattern, altered as far as practicable to correspond with the Artillery Select Committee pattern, are of opinion that the following alterations can be made advantageously in the 6 and 9 Pdr. Gun Carriages, Waggons and Limbers, and 24 and 12 Pdr. Howitzer Carriages, Waggons and Limbers.

Nave Boxes,.....	To be all of the Artillery Select Committee Pattern.
Axletree Arms,.....	
Iron Handspike,.....	
Small Store Box to be moveable,....	
Ammunition Boxes,.....	

The pintle loops and hooks are already of the same pattern in both Cullen's and the Artillery Select Committee Pattern.

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2. The Committee reserve the question of the adaptation of the 9 Pdr. Carriage for either Light or Heavy 9 Pdr. Guns, until a Return, now in preparation, of the number of Light and Heavy Guns, and Carriages for the same is laid before them.

3. There being only three Light 24 Pdr. Howitzers in use, the Committee consider that they may with propriety be left out of the question altogether.

4. With reference to the question, as to whether the Wheels and Axle-tree Arms of the G. O. G. pattern can be assimilated to the Artillery Select Committee pattern, the Committee beg to reserve that question for a future Meeting, as none of these Carriages were submitted to the Committee.

MEETING 164.

EXTRACT FROM THE PROCEEDINGS OF THE PERMANENT ARTILLERY SELECT COMMITTEE, ASSEMBLED BY ORDER OF COLONEL P. MONTGOMERIE, C. B., BRIGADIER COMMANDANT OF ARTILLERY.

Artillery Depôt, St. Thomas' Mount, 10th October, 1850.

Present.

LIEUT. COL. F. F. WHINYATES, *Principal Commissary of Ordnance.*
LIEUT. COL. P. HAMOND, *Commanding 5th Battalion Artillery.*
LIEUT. COL. G. ALCOCK, *Commanding 2d Battalion Artillery.*
MAJOR P. J. BEGBIE, *Acting Director Artillery Depôt.*
MAJOR J. W. CROGGAN, *2d Battalion Artillery.*
CAPTAIN B. W. BLACK, *Assistant Adjutant General of Artillery.*

ARTICLE 586.

SAUL WOOD FOR ORDNANCE PURPOSES, A DECIDED AND FINAL REPORT UPON.

The Military Board state[a] that in consequence of the defects which have recently appeared in perfectly new Carriages con-

(a) No. 4744, 27th Aug. 1850.

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structed of Saul wood, they deem it necessary to come to some determination on the subject, and request that the question whether Saul wood shall be continued as one of the authorized Woods, may be submitted to the Permanent Artillery Select Committee for their decided and final report.

The following documents are laid before the Committee.

1. *Letter from the Secretary to Government, Military Department, Fort William, to the Secretary to Government, Military Department, Fort Saint George.*(b)

(b) No. 273, 14th July, 1848.

2. *Letter from the Secretary Military Board, Fort William, to the Secretary Military Board, Fort Saint George.*(c)

(c) No. 647, 3d June, 1844.

(d) No. 4795, 8th Nov. 1844. 3. *Letter from do. to do.*(d)

(e) No. 1361, 26th June, 1845. 4. *Letter from do. to do.*(e)

(f) No. 4293, 3d Nov. 1845. 5. *Letter from do. to do.*(f)

(g) No. 6757, 3d Feb. 1846. 6. *Letter from do. to do.*(g)

(h) No. 7210, 21st Feb. 1846. 7. *Letter from do. to do.*(h)

(i) No. 575, 14th Dec. 1849. 8. *Report on the A Troop Carriages.*(i)

9. *Letter from Captain W. H. Miller, to the Secretary Military Board, Fort Saint George.*(k)

(k) No. 107, 3d June, 1850.

10. *Letter from the Brigadier Commandant of Artillery, to the Secretary Military Board, Fort Saint George.*(l)

(l) No. 466, 22d July, 1850.

11. *Letter from the Superintendent Gun Carriage Manufactory, to the Secretary Military Board.*(m)

(m) No. 511, 8th Aug. 1850.

(n) No. 417, 5th July, 1850. 12. *Letter from do. to do.*(n)

13. *Letter from the Brigadier Commandant of Artillery, to the Secretary Military Board.*(o)

(o) No. 448, 15th July, 1850.

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14. *Letter from the Superintendent Gun Carriage Manufactory, to the Secretary Military Board.*(p)

(p) No. 513, 8th Aug. 1850.

15. *Letter from the Brigadier Commandant of Artillery, to the Secretary Military Board, Fort St. George.*(q)

(q) No. 280, 23d April, 1850.

16. *Letter from do. to do.*(r)

(r) No. 537, 31st Aug. 1850.

17. *Letter from the Military Board, to the Superintendent Gun Carriage Manufactory.*(s)

(s) No. 2342, 11th June, 1844.

18. *Letter from do. to do.*(t)

(t) No. 2412, 18th June, 1844.

19. *Letter from the Military Board, to the Brigadier Commandant of Artillery.*(u)

(u) No. 4742, 3d Sept. 1850.

20. *Letter from do. to do.*(v)

(v) No. 4886, 27th Aug. 1850.

21. *Letter from the Superintendent Gun Carriage Manufactory to the Secretary Military Board, regarding the seasoning of the wood of which the Carriages built in the years* 1848-49, *were constructed.*(w)

(w) No. 689, 7th Oct. 1850.

Opinion.—It is stated in Captain Maitland's letter that the Saul of which the Carriages before the Committee were built, had only been in a half wrought state for about 2 or 3 months, while according to the Report from Bengal 3 or 4 years are necessary to season it; the Committee must therefore infer, from the appearance of the Carriages, and the manner in which the wood work has shrunk, that they were manufactured of Saul not properly seasoned, and therefore that a fair opportunity has not been obtained at Madras of testing the merits of that description of wood.

2. The Committee, however, from the perusal of the various papers before them and a personal inspection of the Carriages made of the Saul timber, are of opinion, that Saul is objectionable for the construction of Gun Carriages, owing to the extreme length of time that it takes to season: the Committee therefore decidedly reject it for this Presidency.

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3. With reference to the 7th para. of the Military Board's letter,* the Committee have no hesitation in stating that they see no cause whatever for imputing the defects complained of in the Carriages of the D Troop Horse Artillery, to any negligence or remissness on the part of the Officer Commanding it.

* No. 4744, 17th Aug. 1850.

4. The above remark applies equally to the Carriages in the Field Train at the Artillery Depôt.

Letter No. 4744, *from the Secretary Military Board, to the Brigadier Commandant of Artillery, dated* 27*th August,* 1850.

The Military Board have had under consideration for some time past, the question whether Saul wood so extensively used in Bengal, shall continue to be used for Ordnance purposes at this Presidency with reference to the opinions of the Artillery SelectCommittee already recorded as per margin,† which though unfavorable to its retention for the purposes, to which now applied, was not so decidedly opposed as to justify the Military Board in at once directing its discontinuance, as one of the authorized woods, but the defects that have recently appeared in perfectly new Carriages of this wood, render it necessary for the Board to come to some determination on this point, and I am therefore, instructed to convey the request of the Board that the question whether Saul wood shall be continued as one of the authorized Woods may be submitted (with the documents accompanying this communication) to the Artillery Select Committee for their decided and final opinion.

† Select Committee Proceedings, Article No. 405, page 457.
„ No. 555, page 22 (1850.)

2. The introduction of Saul wood into this Presidency originated with the Special Board of Artillery Officers at Cal-

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cutta assembled in 1838, whose report as will be seen by a reference to pages 279, 280, 281, was unanimous in favor of Saul for cheeks of Carriages, and at page 314 adverse to Teak Timber for Ordnance purposes, and the Board have in their possession a report as to the perfect suitableness of Saul Wood for Ordnance purposes in the Bengal Presidency under letter* from the Secretary to Government of India (herewith forwarded) of the recent date of 14th July, 1848. But after a trial of 12 years, our experience of this species of Timber is almost the reverse of that of Bengal.

* In M. C. No. 3292 of date 8th August, 1848, to be returned.

3. The Artillery Select Committee in one of their Reports, (page 349 in paras. IV., V., and VI. of Article 368 in Meeting 126) made very judicious observations as to the necessity of caution in the use of Saul till something more decided was known as to the time required for seasoning, and as to the expediency of ascertaining the process of seasoning followed in Bengal, whereupon this Board issued directions† to the Superintendent of the Gun Carriage Manufactory not to use this Timber till perfectly seasoned, and to make Reports to the Board, when it became perfectly seasoned and fit for use, and further applied for, and readily obtained from the Bengal Military Board the several reports noted in the margin‡ which afford full detail as to the process of seasoning Saul Wood and the mode of application to Ordnance purposes.

† Board's letter to Superintendent Gun Carriage Manufactory, No. 2342 of 11th June, 1844, No. 2412 of 18th June, 1844.

‡ From Mily. Board Bengal,
647 3d June, 1844.
4795 29th Nov. 1845.
1361 26th June, 1845.
4293 3d Nov. 1845.
6757 3d Feb. 1846.
7210 21st Feb. 1846.

4. The above papers are herewith forwarded with the view of supplying the Select Committee with the whole of the information they stated to be required (Vide para. 4 of their report in Article 555) before making a decided report on the fitness of Saul Wood.

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5. The Board wish to simplify the question as far as possible by setting aside the consideration of the *means* of obtaining this wood, the wasteful way in which Logs cut up and the insufficiency of scantling of the Logs, these being points which however important as regards economy do not affect the actual suitableness of the wood for Ordnance Carriages.

6. The questions which the Board would now submit for the consideration of the Artillery Select Committee are comprised in the Reports (as per margin) on the causes of the defects in the new Carriages constructed of this Timber now in use with the A and D Troops of Horse Artillery, and also those at present in the Field Train under orders for Bangalore, in all four complete Batteries of Artillery besides those Carriages in the Field Train. In those at the Mount defects became apparent before they were ever put into use and although then repaired, again after being a short time in use at the Mount, whilst those with the D Troop showed defects after a short march to Bangalore, and although repaired at that Station, again after the march to Kamptee.

Comdt's. Report, dated 14th Dec. 1849, No. 575.
D Troop Carriages, Article 555 of S. C. Proceedings.
From Brigr. Comg. N. S. Force, No. 107 of 6th June, 1850.
From Brig. Comdt. Artillery, No. 466 of 22d July, 1850.
From Supt. G. C. Manfy. No. 511 of 8th August, 1850.
G. C. Manfy. 5th July, 1850, No. 417.
Comdt. of Artillery, 15th July, 1850, No. 448.
G. C. Manfy. 8th August, 1850, No. 513.
Comdt. of Artillery, 23d April, 1850, No. 280.
Comdt's. Reports, 31st August, 1850.

7. It will be for the Committee after carefully inspecting the Carriages at the Mount to determine whether the defects in these Carriages, as well as in those at Nagpore with the D Troop of Horse Artillery, can be ascribed to neglect, in delaying to tighten bolts, bands, tires, &c. &c., as implied by the 5th para. of Letter No. 511 of 8th August, 1850, from the Superintendent of the Gun Carriage Manufactory in reference to the Carriages of the D Troop, or whether these defects may not arise from imperfect seasoning of the wood, or other causes.

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Special Report of the Permanent Artillery Select Committee on the undermentioned New Light Field Carriages and Waggons of the Artillery Select Committee Pattern now in the Field Train at Artillery Head Quarters, directed to be made by the Military Board in their letter No. 4742, dated 3d September, 1850.

Number.	No. of Carriage	Weight of Carriage. cwts.	qrs.	lbs.	Weight of Limber. cwts.	qrs.	lbs.	Pattern.	Made. When.	By whom.	Description of Wood Constructed of.	Calibre.	Remarks.
1	12	14	0	4	12	1	20	Artillery Select Committee.	1849	J. M.	Saul.	12 Pdr. Howr. Carriage.	The Artillery Select Committee having carefully and minutely examined the whole of the Carriages in this Report, find the Wood work in the whole, to be so much shrunk, as to render them unfit for Service in their present state. A large crack likewise appears in one of the Beams of the Carriages. The Committee are of opinion that the serious defects observed in these Carriages, are to be attributed to the wood of which they are constructed not having been properly seasoned.
1	10	13	3	16	12		21		,,	,,		9 Pdr. Carriage.	
2	11	13	0	2	12	1	7		,,	,,		,,	
1	7	12	3	18	12	2	0		1848	,,		6 Pdr. Carriage.	
2	8	12	3	22	12	2	4		,,	,,		,,	
3	12	13	0	14	12	1	20		1849	,,		,,	
4	13	13	0	17	12	1	14		,,	,,		,,	
5	14	13	0	0	12	1	21		,,	,,		,,	
6	15	12	3	21	12	1	3		,,	,,		,,	
7	16	13	0	0	12	3	21		,,	,,		,,	
8	17	12	3	14	12	3	10		,,	,,		,,	
9	18	12	3	25	12	3	20		,,	,,		,,	
10	19	13	0	0	12	3	27		,,	,,		,,	
11	20	12	3	14	13	0	14		,,	,,		,,	
12	21	12	3	15	12	3	24		,,	,,		,,	
1	28	15	0	18	12	0	21		,,	,,		24 Pdr. Howr. Waggon.	
1	19	14	3	21	12	1	12		,,	,,		12 Pdr. Howr. Waggon.	
2	25	15	0	6	12	2	0		,,	,,		,,	
3	26	15	0	20	12	2	0		,,	,,		,,	
4	38	15	1	0	12	2	0		,,	,,		,,	
5	39	15	0	25	12	2	13		,,	,,		,,	
6	40	15	0	21	12	2	4		,,	,,		,,	
1	41	15	0	2	12	1	9		,,	,,		9 Pdr. Waggon.	
2	42	15	0	7	12	1	9		,,	,,		,,	
3	43	14	3	18	12	1	0		,,	,,		,,	
4	44	14	3	25	12	0	14		,,	,,		,,	
5	45	14	3	17	12	0	13		,,	,,		,,	
6	46	15	0	11	12	1	0		,,	,,		,,	
7	47	14	3	5	11	3	21		,,	,,		,,	
8	48	14	3	1	11	3	22		,,	,,		,,	
1	32	14	3	17	12	1	21		,,	,,		6 Pdr. Waggon.	
2	33	15	0	10	12	1	16		,,	,,		,,	

(Signed) F. F. Whinyates, Lieut. Col.
,, P. Hamond, Lieut. Col.
,, G. Alcock, Lieut. Col.
Artillery Depot, Saint Thomas' Mount, 10*th October*, 1850. ,, P. J. Begbie, Major,
,, J. W. Croggan, Major,
,, B. W. Black, Captain.

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Special Report of the Permanent Artillery Select Committee on the undermentioned Light Field Carriages and Waggons in the Field Train, and in use at Artillery Head Quarters, directed to be made by the Military Board in letter No. 4886, *dated* 27*th August*, 1850.

Number.	No of Carriage.	Weight. cwt.	qrs.	lbs.	Pattern.	Made. When.	Made. By whom.	Description of Wood constructed of.	Calibre.	Remarks.
1	1	12	2	15	A. S. C.	1848	J. M.	Constructed entirely of Tenasserim Teak.	Carriage Howr. 24 Pdr.	The Committee having carefully examined these Carriages, find them to be in a perfectly serviceable state.
2	2	12	2	16	,,	1848	J. M.		,,	
3	3	12	1	11	,,	1848	J. M.		,,	
1	1	11	0	21	,,	1848	J. M.		Limber Howr. 24 Pdr.	
2	2	11	0	11	,,	1848	J. M.		,,	
3	3	11	0	13	,,	1848	J. M.		,,	
1	3	11	1	0	,,	1848	J. M.		Carriage Gun 6 Pdr.	
1	3	11	0	6	,,	1848	J. M.	Entirely of Tenasserim Teak except, Pole, Splinter Bar, Brackets, Lashing bar and pole rest.	Limber Gun 6 Pdr.	
1	1	Carriage			Major Anstruther's.		J. M.	Beams of Tenasserim Teak.	Carriage with Limber for all Light Field Ordnance	
1	1	Limber			Major Anstruther's.		J. M.	Entirely of Tenasserim Teak exceptingSpokes Fellies, Pole and Splinter Bar of Limber.	Carriage with Limber for all Light Field Ordnance	
1	5	12	0	26	A. S. C.	1848	J. M.	Entirely of Tenasserim Teak.	Carriage Howr. 12 Pdr.	
2	6	12	0	0	,,	1848	J. M.		,,	
1	5	11	1	2	,,	1848	J. M.	Entirely of Tenasserim Teak except Poles, Splinter Bars, Brackets, Lashing Bars, and Pole rests.	Limber Howr. 12 Pdr.	
2	6	11	0	24	,,	1848	J. M.		,,	
1	70	11	1	2	G. O. G.	1846	J. M.	Entirely of Tenasserim Teak except Poles, Splinter Bars, Shafts, and Pole rests of Limbers.	Ammunition Waggon 6 Pdr.	
1	70	12	2	23	,,	1846	J. M.		Ammunition Limber 6 Pdr.	
1	78	12	2	22	,,	1846	J. M.		Ammunition Waggon 12 Pdr.	
1	78	11	1	24	,,	1846	J. M.		Ammunition Limber 12 Pdr.	
1	1	13	2	9	A. S. C.	1846	J. M.	Entirely of Tenasserim Teak except Pole rest and Handspike.	Ammunition Waggon 6 Pdr.	
1	1	11	2	13	,,	1846	J. M.	Entirely of Tenasserim Teak except Pole, Splinter Bar, Pole rest and Brackets.	Ammunition Limber 6 Pdr.	

(Signed) F. F. Whinyates, Lieut. Col.
,, P. Hamond, Lieut. Colonel,
,, G. Alcock, Lieut. Colonel,
,, P. J. Begbie, Major,
,, J. W. Croggan, Major,
,, B. W. Black, Captain.

Artillery Depot,
St. Thomas' Mount,
10*th October*, 1850.

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MINUTE BY LIEUT. COLONEL WHINYATES.

The Saul Carriages submitted for the inspection of the Artillery Select Committee having been made of unseasoned Timber require so much setting up in all parts, that I deem it necessary to record my opinion as to their efficiency.

These Carriages are not to be depended on. Wheels with spokes and felloes of Saul throughout, I consider, with the information before me almost unserviceable, and I would therefore recommend that no repairs should be made to these Carriages at present but that the paint be removed as speedily as possible, and the Carriages be subjected to a fair service exposure for a considerable length of time after which be drawn up, and again examined.

Painting unseasoned timber most undoubtedly retards the process of seasoning, nay more, brings on a rapid decay of the wood.

Though some of the Saul Logs used in these Carriages have undergone a surface seasoning process for nine years from the time of felling to that of working up, still only from 1 to 3 months has been allowed for the half wroughts, *i. e.* of the inner portion of the Logs. This appears to me to be the cause of these Carriages being found in their present unsatisfactory condition as from documents before the Committee, Saul is stated not to season in Log or Beam.

(Signed) F. F. WHINYATES, Lieut. Colonel.

14*th October*, 1850.

I fully concur in the above.

(Signed) G. ALCOCK, Lieut. Colonel.

MINUTE BY LIEUT. COLONEL HAMOND.

1. I do not consider that justice has been done to Saul wood at Madras, or that any opportunity has been afforded us of testing its merits, as the Carriages now before the Committee have been constructed of half wrought materials which have only been in that state 2 or 3 months, while Major Abbott reports that even in the dry climate of Futtyghur, 3 or 4 years

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are required to season half wrought pieces of Saul; it is not therefore to be wondered at that our Carriages have become nearly unserviceable as soon as built, but it would be, I conceive, very unjust to condemn the wood on that account.

2. From the experience of the Bengal Artillery and the recorded results of experiments carried on at the Presidency, I am decidedly of opinion that Saul wood may be employed with great advantage for Beams, Poles, &c. of Gun Carriages, though it does not appear to be well adapted for spokes and felloes.

3. When Saul was first brought into notice in 1818, it was considered by the Bengal Artillery, as it is at the present moment by many of our own officers, unfit to be used at all in the construction of Gun Carriages, this, however, was owing to their having applied it indiscriminately to all purposes, and used wood not sufficiently seasoned, time and experience have convinced them of their error and they now "find, that* in the hour of need it never fails them."

*Vide Major Abbott's Report.

4. If unseasoned Saul be used, and which has evidently been the case at Madras, for building Gun Carriages, it is perhaps the worst wood that can be applied to that purpose, as it shrinks more than any other, a plank 12 inches broad was reduced to 11·475 by a few days exposure; at Futtyghur, where the climate is particularly dry and the hot winds exceedingly powerful, it requires 7 years to season Saul for the cheeks of 12 and 24 Pdr. Howitzers.

(Signed) P. Hamond, Lieut. Colonel.

October 11*th*, 1850.

I concur in the above.

(Signed) J. W. Croggan, Major.

Minute by Major P. J. Begbie.

I have signed the accompanying Proceedings, as fully coinciding in the latter portion of the Committee's opinion as to

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the rejection of Saul wood for Ordnance purposes, but I do not concur in the opening part of it, which would imply, that if properly seasoned, it would probably be found to answer for the reasons assigned below.

2. The 8th, 9th, 10th, and 11th paras. of Captain Abbott's report, dated 8th October, 1845, (annexed) show such extraordinary shrinkings and expansions of a very small piece of Saul wood, as would lead to the conclusion that it is of an extremely bibulous nature, and consequently perfectly unsuitable to a climate where there are such extreme variations of dry and surcharged Atmosphere.

3. This is borne out by the 12th para. in which the result of a microscopic examination showed it to consist of very little fibre, but to abound with "Myriads of minute capillary tubes." These tubes do not appear, as in the Sissoo wood, to have been clogged with any resinous substance, and the inference naturally is that they were hollow, and would thus, whatever might be the state of seasoning to which the timber had been subjected, imbibe the humidity of the Atmosphere as freely as the pores of a sponge. Nothing short of the expensive Kyanising process would obviate this constitutional defect, and I therefore consider Saul as a wood to be unequivocally rejected.

4. I would not have entered so minutely into the subject, had I not considered it to be one of vital importance to the Service.

ARTILLERY DEPÔT,
14th October, 1850.

(Signed) P. J. BEGBIE, Major,
Actg. Director Artillery Depôt.

Extracts from Major Abbott's letter, dated 8th October, 1845.

8. "A piece of plank cut in July, 1844, from a Saul "Timber that had been 2 years felled, measured in "breadth inches 12, and weighed.....Ozs. 9·25."

9. "It was exposed to the heat of the sun for four "or five days, and being then quite dry, its breadth "was reduced to inches..... .....11·475

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"and its weight to..... Ozs. 6·25."

10. "In March, 1845, its breadth was.....Inches 11·5
"In August, 1845, (after much rain)..... „ 11·675
"In September, 1845, (after a few dry days).... „ 11·600
"From July, 1844, to September, 1845, it lay upon a
"shelf in a room, whose doors were generally open,
"excepting in April, May and June."

11. "It was next immersed in water for 48 hours,
"at the end of which time it measured.....Inches 11·75
"and weighed..... Ozs. 6·75

12. "When a cross section of the (dry) wood was examin-
"ed by means of a powerful Lens, it exhibited very little
"fibre, amongst myriads of Minute Capillary tubes."

True Extracts.

(Signed) P. J. Begbie, Major,
Actg. Director Artillery Depôt.

Minute by Major J. W. Croggan.

I do not agree with the Committee in entirely rejecting Saul Wood, it never having been properly tested by the Madras Artillery, and circumstances may render its occasional use desirable, in other respects I fully concur in the opinion given by the Committee.

14*th October*, 1850. (Signed) J. W. Croggan,
Major.

Minute by Captain B. W. Black.

I concur in the opinion given in 3d and 4th paras., and in the 1st, as far as thinking the Timber, of which these Carriages have been constructed, had not been sufficiently seasoned, but I do not perceive that because they afford no criterion for judging of the merits of Saul as a timber for Ordnance purposes, no other opportunity of testing has been obtained at Madras.

With regard to the 2d para. if arrangements similar to those in Bengal were adopted for seasoning this timber, in

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the course of time no such objection could be urged against it; but I think Saul Timber may be rejected in consequence of its high specific gravity, inferior tenacity compared with other woods, waste in cutting up, and liability to be affected by variations of the atmosphere.

(Signed) B. W. Black, Captain,
14*th October*, 1850. *Asst. Adjt. General of Artillery.*

ARTICLE 587.

Carriage for Light 9 Pounder Gun adapted to receive either a Light Gun of Cwt. 8-3-21 or one of Cwt. 10, (Vide Meeting 163, Article 585, para. 2.)

The following documents are laid before the Committee.

* Dated 30th September and 10th October, 1850.

1*st. Proof Reports of the* 9 *Pounder Carriage.**

2d. Memorandum of 9 *Pounder Gun Carriages in use with the Regiment and in Store at Out-Stations constructed for Guns of Cwts.* 8-3-21.

Opinion.—The Committee having inspected the 9 Pounder Gun Carriage fitted up with the Semelle and Cradle, and particularly noticed the failures pointed out in the Proof Reports of the same, are decidedly of opinion that it is impracticable to adapt the Light 9 Pounder Carriage constructed for a Gun of cwt. $8\frac{3}{4}$, to answer for either a Light or Heavy 9 Pounder Gun.

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Report of a Proof of the undermentioned Light Field Carriage by order of Colonel P. Montgomerie, C. B., Brigadier Commandant of Artillery. This Carriage was constructed for a Light Gun of cwts. 8-3-21, and by order of the Military Board in letter No. 3099, dated 22d June, 1850, has been fitted up with a Cradle and Semelle to adapt it to receive either a Light 9 Pdr. Gun of cwts. 8-3-21, or one of cwts. 10.

Description.	No. of Carriages.	No. of Firings.	Nature and Strength of Powder.	Marks on the Ordnance.	Marks on the Carriage.	Weight of Metal. cwt.	Weight of Metal. qrs.	Weight of Metal. lbs.	Weight of Carriage. cwt.	Weight of Carriage. qrs.	Weight of Carriage. lbs.	Charge. lbs.	Charge. ozs.	Shot. lbs.	Shot. ozs.	Elevation. D.	Elevation. M.	Recoil. Feet.	Recoil. Ins.	Time in Firing.	REMARKS.
Carriage Light Field 9 Pounder, fitted up with a Semelle and Cradle.	—	25 5 5	Madras C. P. April 1849, pit Pressed and Glazed 8 Inch Iron Mortar, charge 1 lb. P. R. 650 yards.	A. Wilson, Cossipore, 1841, No. 126.	J. H. F. 1838, No. 30.	8	3	21	11	1	4	2	4	9	0	P. 3 7	B. 30 0	4 4	6 0	45 Minutes.	HEAVY GUN.—At P. B. the centre of the base ring of the cwt. 10 Gun rested on the Semelle over the centre of the elevating screw. No injury was sustained by the carriage during the proof with this Gun. The highest elevation obtained was 7°;—12½° being the highest without the intervention of a Semelle.
				None.	None.	10	0	9								P. 3	B. 30	6 6	0 0		LIGHT GUN.—At P. B. the centre of the base ring of the Light Gun of cwt. 8¾ rested on the Semelle ½ an inch in front of the centre of the elevating screw. No injury was sustained by the 5 rounds at P. B.

At the medium elevation viz. 3½°, the centre of the base ring was 1 Inch in front of the centre of the elevating screw. At the first round, the iron rods, of the Semelle were much bent, and at the second round broke short off at the wooden part of the Semelle.—The cradle did not shift.

With the heavy gun at P. B. without the Semelle, the centre of the Base ring rested on the centre of the elevating screw.

At 6° 8 tenths of an inch in front.
At 12° 1½ inch in front.

With the Light Gun at P. B. without the Semelle the centre of the Base ring rested 8 tenths of an inch in front of the centre of the elevating screw.

At 6° 1 1/10 inch in front.
At 12° off the screw entirely, about ½ an inch.

ARTILLERY DEPÔT,
Saint Thomas' Mount,
30th September, 1850.

(Signed) P. MONTGOMERIE, Brigadier,
Commandant of Artillery.

(Signed) P. J. BEGBIE, Major,
Acting Director Artillery Depôt.

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Report of a proof of the undermentioned Light Field Carriage, by order of Colonel P. Montgomerie, C. B., Brigadier Commandant of Artillery.

Description.	No. of Carriages.	No. of Firings.	Nature and Strength of Powder.	Marks on the Ordnance.	Marks on the Carriage.	Weight of Metal. cwt.	Metal. qrs.	Metal. lbs.	Carriage. cwt.	Carriage. qrs.	Carriage. lbs.	Charge. lbs.	Charge. ozs.	Shot. lbs.	Shot. ozs.	Elevation. D.	Elevation. M.	Recoil. Feet.	Recoil. Ins.	Time in Firing.	REMARKS.
Carriage Light Field fitted up with a Semelle and Cradle for a 9 Pounder Gun.	1	5 5 5	M. P. August, 1842, Milled, Iron Mortar 8 inch, 1 lb. P. R. 899 yards.	A. Wilson, Cossipore, 1841, No. 126.	J. H. F. 1838, No. 30.	10	0	9	11	1	4	2	4	9	0	P. 3 7	B 30 0	6 5 5	0 6 0	30 Minutes.	This is the same Carriage which was proved and failed on the 30th ultimo. On the present occasion the cradle had been removed 1¼ inch towards the front of the Carriage and the Semelle shortened the same length so as to allow the friction point to rest on the centre of the Elevating screw:—by this arrangement, the centre of the base ring of the Heavy 9 Pounder Gun projected at P. B. 1¼ inch over the centre of the Elevating screw but, at the highest elevation, viz. 7° it rested over the centre of the elevating screw;—the centre of the Base ring of the Light 9 pounder Gun, had it been used would have rested over the centre of the elevating screw at P. B. and have projected 1¼ inch in front at the highest elevation. The Heavy 9 pounder was only used. At the second round at P. B. the iron rods of the Semelle were slightly bent upwards. At the 5th round the tongue of the Traversing handspike broke off. After the 15th round the Gun was taken off the Carriage, when one of the iron bars of the Semelle was found to be fractured close to the wooden part, and the upper angle of the Cradle band inside the left cheek broke.

ARTILLERY DEPÔT,
Saint Thomas' Mount,
10*th October*, 1850.

(Signed.) P. MONTGOMERIE, Brigadier,
Commandant of Artillery.

(Signed) P. J. BEGBIE, Major,
Acting Director Artillery Depôt.

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MEETING 165.

EXTRACT FROM THE PROCEEDINGS OF THE PERMANENT ARTILLERY SELECT COMMITTEE, ASSEMBLED BY ORDER OF COLONEL G. CONRAN, BRIGADIER COMMANDANT OF ARTILLERY.

Artillery Depôt, St. Thomas' Mount, 28th October, 1850.

Present.

LIEUT. COL. F. F. WHINYATES, *Principal Commissary of Ordnance.*
LIEUT. COL. H. S. FOORD, *Commanding 4th Battalion Artillery.*
LIEUT. COL. G. ALCOCK, *Commanding 2d Battalion Artillery.*
MAJOR P. J. BEGBIE, *Acting Director Artillery Depôt.*
MAJOR J. W. CROGGAN, *2d Battalion Artillery.*
CAPTAIN J. MAITLAND, *Superintendent Gun Carriage Manufactory.*
CAPTAIN B. W. BLACK, *Assistant Adjutant General of Artillery.*

ARTICLE 588.

ON THE ASSIMILATION OF THE AXLES, WHEELS, &c., OF COLONEL CULLEN'S, THE G. O. G., AND ARTILLERY SELECT COMMITTEE PATTERN CARRIAGES.

In continuation of the Proceedings of the Permanent Artillery Select Committee, 21st September, 1850,(a) on the subject of assimilating the old Madras Cullen's, the Special Board, and G. O. G. 1842 patterns to the Artillery Select Committee pattern Light Field Carriages, Limbers and Waggons, the following Carriages and Waggons which have been partly fitted up with the proposed alterations at the Gun Carriage Manufactory, are submitted for the inspection and report of the Committee.

(a) Meeting 163. Article 585.

1	Carriage and Limber			.....	Artillery Select Committee Pattern.
1	„	„	„	.....	Cullen's „
1	„	„	„	.....	Special Board „
1	„	„	„	.....	G. O. G. 1842 „

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1 Ammunition Waggon and Limber. Artillery Select Committee Pattern.
1 „ „ „ Cullen's „

The following Memorandum exhibits the alterations which are proposed to be made to assimilate the Carriages.

Memorandum exhibiting the alterations proposed to be made to the Artillery Select Committee pattern Carriages, Limbers, and Waggons, and to the other existing patterns of Carriages and Waggons, to assimilate them to the Artillery Select Committee pattern.

Artillery Select Committee Pattern.

CARRIAGES AND LIMBERS.

Boxes copper, to have loose lids of one piece of copper with rings on the top, without hinges.

Hooks for locking chains, to be tapped and screwed into the beam, instead of being jagged and driven in.

Plate pintle loop, to have a reservoir for oil.

Staples, for leather straps for fastenings, to be made stronger.

WAGGONS AND LIMBERS.

Boxes copper, to have loose lids of one piece of copper with rings on the top without hinges.

Hooks for locking chains, to be tapped and screwed into the beam instead of being jagged and driven in.

Plate pintle loop, to have a reservoir for oil.

Staples, for leather straps for fastenings, to be made stronger.

G. O. G. of 1842 Pattern.

CARRIAGES.

Axle arms altered to the A. S. C. P.—wooden nave wheels removed, and brass nave wheels A. S. C. P. substituted.

Boxes shot and match A. S. C. P. to be added.

Hooks for locking chains, to be tapped and screwed into the beam instead of being jagged and driven in.

Plates friction, introduced as in the A. S. C. P.

Staples, for fastenings, made stronger.

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LIMBERS.

Axle arms altered to the A. S. C. P.—wooden nave wheels removed and brass nave wheels of the A. S. C. P. substituted.

Bands for shafts removed.

Perches or short Poles with pintle hooks of A. S. C. P. substituted for the present hooks on axle beds.

WAGGONS.

Wheel rest, or Saddle block, to be fitted to receive wheels of A. S. C. P.

Wheels wooden nave to be removed, and brass nave wheels A. S. C. P. to be substituted, and axle arms altered to the A. S. C. P.

Special Board Pattern.

CARRIAGES.

Axle arms, to be altered to receive washers and linch pins as the A. S. C. P.

Boxes match, to be removed and shot and match boxes of the A. S. C. P. fixed on axletree bed.

Hooks for locking chains, to be introduced.

Loops pintle, to be removed, and those of the A. S. C. P. substituted.

Nuts drag hook in rear of axle, to be removed.

LIMBERS.

Axle arms, to be altered to receive washers and linch-pins of the A. S. C. P.

Board's foot, to be altered to the A. S. C. P. to receive the Pole bar.

Boxes ammunition, partitions to be altered to A. S. C. P.

Boxes grease, to be added.

Boxes small store, to be fitted up with handles, and detached from the limber.

Perches or short Poles with pintle hooks A. S. C. P. to be substituted for the present hook on axle bed.

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Pole nose cap, to be removed and a pole nose cap of the A. S. C. P. substituted.

Swivels with clip bands, to be removed, and swivel with clip band A. S. C. P. to be substituted.

WAGGONS.

Boxes grease to be fitted to the bottom of framing.

Hook for locking chains and spare axle, to be fixed as in the A. S. C. P.

Colonel Cullen's Pattern.

CARRIAGES.

Axle arms, to be altered to the A. S. C. P. wheels reamed out to fit; the deficiency in length of nave made up by a thin washer, and the eye washers and linch pins made to fit.

Boxes match, to be removed, and shot and match boxes of the A. S. C. P. fixed on axle bed.

Loops leather, for hammer, priming iron, drift, and bit, to be fitted.

Nuts drag hook in rear of axle, to be removed.

Plates friction, made as A. S. C. P. by having the collar which enters the nave cut off.

Socket portfire, hooks for locking chains, and loops for fastenings introduced as in the A. S. C. P.

Tongue blocks, end of to be tapped and secured with a nut, having an eye for the locking chain.

LIMBERS.

Axle arms, altered to the A. S. C. P. wheels reamed out to fit, deficiency in length of nave to be made up by a thin washer, and eye washers and linch pins made to fit.

Boxes grease, to be added.

Boxes limber removed, and 2 boxes A. S. C. P. substituted.

Boxes small store, fitted with handles and detached from the limber.

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Hooks draught, removed, and draught loops fixed to bottom of axle bed.

Plates friction, made as the A. S. C. P. by having the collars which enter the naves cut off.

Pole nose cap, to be removed, and a Pole nose cap of the A. S. C. P. substituted.

Pole rest, to be added.

Swivel with clip band, to be removed, and one of the A. S. C. P. substituted.

WAGGONS.

Axle arms, altered to the A. S. C. P. the wheels reamed out to fit; the deficiency in length of nave made up by a thin washer, eye washers and linch pins made to fit.

Boxes ammunition, 3 to be removed and frame of waggon altered to receive 4 boxes of A. S. C. P. and to carry a crowbar, handspike, pickaxe, and drag ropes.

Boxes grease, two to be fitted to the bottom of waggon.

Hooks for locking chains, and spare axle, fixed as in the A. S. C. P.

Plates friction, made as in the A. S. C. P. by the collars which enter the Naves being cut off.

Wheel rest, or saddle block fitted on the beam for spare wheel.

ARTICLE 589.

AS TO THE EXPEDIENCY OF PROCURING HALF WROUGHTS, INSTEAD OF PURCHASING LARGE BEAMS OF TIMBER.

The Military Board direct[a] with reference to the suggestions of the Permanent Artillery Select Committee[b] as to the expediency for economy and efficiency of procuring Half Wroughts on the spot instead of purchasing large beams of Timber to be cut

(a) No. 4855, 4th Sept. 1850.

(b) Meeting 159, Article 555, (Page 22.)

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up at the Manufactory, that a letter(c) from the Superintendent Gun Carriage Manufactory explaining his reasons for objecting thereto, and a copy of the Military Board's letter(d) in reply, be laid before the Committee, for their opinion thereon.

(c) No. 597, 2d Sept. 1850.

(d) No. 5052, 4th Sept. 1850.

Letter No. 597, from Captain J. Maitland, Superintendent Gun Carriage Manufactory, to the Secretary Military Board, dated 2d September, 1850.

In reply to your letter No. 4598 of the 28th ultimo, I have the honor to state that I differed from my colleagues in the Select Committee on the propriety of getting Saul wood half wroughts cut in the jungle, because I believe it would be found more expensive than getting that timber in log, and cutting it up into half wroughts at the Manufactory. Saul timber has such a tendency to crack, it would not bear the exposure to which it would be liable between the time of cutting in the forest, and housing it at the Manufactory. In the Bengal Gun Carriage Agency, the logs are cut up at the Manufactory into half wroughts and deposited for years in sheds with a view to let them gradually season, if the system proposed by the Select Committee had been advisable, Major Abbott and his predecessors would doubtless have followed it; with every care, according to the present system, the quantity of Saul wood half wroughts found unserviceable is considerable.

I should be very happy if I had the data to furnish the Board with the difference of expense of the two systems, but I have not the means of doing so.

The Saul wood in log at the Manufactory is most of it very wet, I have already cut several of the round logs longitudinally to assist it in seasoning, but many of them if cut into half wroughts in their present state, would crack all to pieces.

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I have no Memoranda of the kind called for.

Whether it would be well to have supplies of teak wood half wroughts cut up at, or near the forest is another consideration altogether.

It has been the practice heretofore to select large good timbers, and to cut them up to the best advantage, first, for the largest articles, then, what would not come in for poles, cheeks, trails, naves, or axle cases, was made into spokes, barrel staves, and other smaller articles, and thus reduced the quantity of refuse timber.

My impression is that teak wood half wrought may be kept too long, and one advantage of having supplies in log, is, that they can be always cut as required to meet the latest improvements in carriage building.

I have no data to assist me as to the cost of either system, and in the absence of such information, I would not recommend any change from the existing practice.

Letter No. 5052, *from the Secretary Military Board to the Superintendent of the Gun Carriage Manufactory, dated 4th September,* 1850.

I have the honor to acknowledge the receipt of your letter No. 597, of date 2d September, 1850, stating your reasons for dissenting from the other Members of the Artillery Select Committee in regard to procuring half wrought materials instead of timber in log for Ordnance purposes.

2. The Military Board desire me to observe that this question involves serious considerations both as to economy and efficiency, and it would be advisable for you to give your best attention, to a subject of such importance.

3. The Board consider the term "Half Wroughts" to be incorrectly applied to the state to which the Timber should be reduced when cut up on the spot and would therefore recommend the designation of "third, or rough *wroughts*," as

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better denoting the intermediate state between half wroughts and logs, and would suggest to you to state the scantling of a few of these principal parts of Ordnance Carriages to which you may deem this designation applicable.

4. From our information respecting Saul and Peddowk there can be no doubt of the efficiency of this system as a general measure of economy, for the Saul is trebled, and the Peddowk doubled in price by the Sea freight and landing charges, and the uncertainty of supplies of these kinds of timber is further increased by the difficulty of obtaining vessels willing and able to take in large logs of these heavy woods.

Letter from Superintendent, No. 69, of 4th February, 1850.

5. Your statements show that the out turn in half wroughts of Saul is only one-third, and of Peddowk and Teak about one-half of the cubical contents of the logs, the cost therefore (with freight and charges) of each half wrought of Saul and Peddowk at the Manufactory may be taken respectively to be 9 and 4 times the value of the same quantity of wood at the place of shipment.

6. The Military Board do not suppose that the saving in the price of the half wroughts if cut out on the spot would be equal to the increase of price as enhanced by the present system of bringing entire logs to the Manufactory, and then preparing the half wrought materials, but at any rate, there must be a large difference between the two rates, and even supposing a greater proportion of half wroughts to crack and spoil when cut out on the spot, than at the Manufactory, as you apprehend, the average cost including these losses is not likely to equal that of the same number of half wroughts when prepared at Madras.

7. Besides this, there is an undoubted advantage gained in the facility of transporting *Half*, or even *Third Wroughts* as compared with logs weighing 2 or 3 Tons, for instance, the Steamer "*Hugh Lindsay*" whilst able to transport many pieces of timber, each weighing lbs. 1000 or less, could not

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carry on deck one of the large logs of timber, say lbs. 3000 weight, out of which one of the above pieces of (1000 lbs.) reduced scantling has been cut.

8. Although the Board have received from you, especially of late, many valuable statements respecting the practical working of your department, they are still in want of such full details regarding the out turn of the several batches of timber, as would enable them at this moment confidently to determine on the course to be followed.

Supt's. Letter, No. 391 of 29th June, 1850.

9. For instance the Board although informed by you, that 30,000 cubic feet of Saul has only produced 11,000 cubic feet of half wroughts, are not aware what proportion of this wastage is attributable to defects in the heart of the logs, only observable when cut up, and what to the cracking and spoiling of the half wroughts when cut out, and although the wastage in the latter respect would of course be common to the half wroughts cut out on the spot, the wastage from natural defects in the logs, the heavy charges entailed on the Government for the transport of bad timber would be obviated.

10. It is the practical knowledge of these details, which the Board must be dependent on your Department to furnish, which is necessary to enable the Board to come to a correct decision as to the expediency of following the recommendation of the Artillery Select Committee, and the Board would remark that your observation regarding the practice of the Bengal Carriage Agent is not applicable to your Department, on account of the different circumstances, both in respect to the sources of supply, and the distance from whence obtained. In Bengal the Saul Forests are only 40 miles distant from the Manufactory, and the timber is cut at one season, and floated down to the Manufactory at another season, all this being done by one class of persons employed on this alone, your Manufactory on the contrary is several hundred miles distant from the forests, and the expenses of transport, form a very considerable item in the cost of the wood, but the Board re-

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cognize the circumstances of the two Manufactories to be so far parallel, that they consider you should, as in Bengal, have a branch of your Department on the spot, specially for selecting and cutting up into suitable pieces the logs of wood which the Commissariat Department should be held responsible for procuring.

OPINION.—The Committee are of opinion that the timber should be allowed to remain in log a sufficient time for seasoning, and that it should afterwards be cut up on the spot into half wroughts, and forwarded to the Gun Carriage Manufactory.

MINUTE BY CAPTAIN MAITLAND.

As the system of obtaining Timber in rough wroughts has never yet been tried, I think it would be better to get only a small supply in this way for a year or two, after which time, experience will have proved whether it is a cheaper mode than the present.

2. I would moreover suggest that this experiment be confined to Saul and Peddowk until the stock of Teak at the Manufactory is greater, which may be expected within the next six months.

GUN CARRIAGE MANUFY., 1*st November*, 1850. } (Signed) J. MAITLAND, Capt., *Supt. Gun Carriage Manufy.*

MINUTE BY CAPTAIN BLACK.

The Select Committee in their Proceedings of 28th February, 1850, in Article No. 555, recommend the adoption of the half wrought method of supply of Saul timber with a view to ensure its being properly seasoned as if it were to be an established wood for the Ordnance Carriages of this Presidency, since which the Committee on the requisition of the Military Board have given a decided opinion in favor of the rejection of this timber.

2. As this reason for recommending the half wrought system of supply of Saul does not apply to timber of other des-

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criptions, I shall not be prepared unreservedly to recommend that the method of supply by log be abandoned, which although expensive, is efficient if properly conducted ; until it be proved, the system of supply by half wroughts can be established without apprehension of failure.

(Signed) B. W. BLACK, Captain,
28th October, 1850. *Asst. Adjt. Genl. of Artillery.*

MEETING 166.

EXTRACT FROM THE PROCEEDINGS OF THE PERMANENT ARTILLERY SELECT COMMITTEE, ASSEMBLED BY ORDER OF COLONEL G. CONRAN, BRIGADIER COMMANDANT OF ARTILLERY.

Artillery Depôt, Saint Thomas' Mount, 28th November, 1850.

Present.

LIEUT. COL. P. HAMOND, *Commanding 5th Battalion Artillery.*
LIEUT. COL. H. S. FOORD, *Commanding 4th Battalion Artillery.*
MAJOR P. J. BEGBIE, *Acting Director Artillery Depôt.*
MAJOR J. W. CROGGAN, *2d Battalion Artillery.*
CAPTAIN J. MAITLAND, *Supt. Gun Carriage Manufactory.*
CAPTAIN B. W. BLACK, *Assistant Adjutant General of Artillery.*

ARTICLE 590.

ON CERTAIN BENGAL PATTERN STORES RECOMMENDED IN MEETING 129, ARTICLE 380.

The Military Board direct[a] that the undermentioned correspondence be laid before the Artillery Select Committee to enable them to decide on the pattern of common shell and canister shot to be used in this Presidency ; their attention is also called to former proceedings[b] reporting favorably on Grummets for Spherical Case and Round Shot, whilst preferring the Tin Collar for the common shell.

(a) No. 5312, 20th Sept. 1850.

(b) Meeting 129, Article 380, (Page 387.)

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Letter No. 911, *from the Principal Commissary of Ordnance, to the Secretary Military Board, dated Fort Saint George,* 14*th September*, 1850.

With reference to Board's letter No. 4751 of the 31st ultimo, I have the honor to submit the following observations for consideration.

1st. That the introduction of the Bengal pattern Stores (of which the two items indented for by the Commissary* of Ordnance at Secunderabad, form a portion) and which are specified in Proceedings of Artillery Select Committee, Meeting 129, Article 380,* have never been authorized for general issue in this Presidency. The Bengal patterns of these Articles (Paulin wax excepted,) were transmitted to this Arsenal, bearing the Board's seal for deposit, and on this authority, and that of duly sanctioned Indents, partial issues of some of these Stores have been made.

*Letter No. 192, 15th Aug. 1850, herewith returned.

2d. Having, since this question came under the consideration of the Select Committee, made up as per margin, both shells common, tin collar, and canister Bengal bottoms, it is right that I should bring to the knowledge of the Board, that both these items of Ordnance issues, are of very greatly increased cost compared with the Madras corresponding patterns, and it is for the decision of the Board, whether this increased expenditure is compensated by the greater advantage to the Artillery, by their adoption. My own opinion does not arrive at this result, and I consider that the Madras grummetting for shells common, is preferable to the tin collar, which has the disadvantage which led to the rejection of the wooden glued bottom, viz., the liability to be shaken off, and this I learn was frequently the case, in an instance where they formed part of the Artillery Equipment. The Bengal bottom to the canister, is an elaborate piece of work

Shells common,	24	Pdr.	700
,, ,,	12	,,	700
Shot S. C.	24	,,	650
,, ,,	12	,,	650
Canister B. P.	24	,,	60
,, ,,	12	,,	60

* Page 387.

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difficult to make up and costly, and wanting the simplicity of the Madras pattern.

The Paulin wax, is quite unknown in this Presidency, no muster I believe was received from Calcutta, with the other articles.

The Hammer wrench Bengal pattern is also a very expensive article, difficult in manufacture, and appearing to offer doubtful compensating advantage.

In conclusion I beg the Board will favor me with instructions, whether I am to consider the above referred to items, as introduced in lieu of the Madras patterns, and whether I am to prepare them for general issue, when the present stock in the Arsenal of Madras patterns are expended.

Letter No. 1003, *from the Principal Commissary of Ordnance, to the Secretary Military Board, dated 9th October,* 1850.

I have the honor with reference to letter No. 5312 of the 30th ultimo, to attach Memoranda relative to the different methods of fitting collars to shells and bottoms to canister, after the Bengal and Madras patterns. I beg also to place before the Board two shells prepared with the ordinary grummetting placed *round the fuze hole* a plan which appears to offer all the advantages of the Bengal tin collar, and to be free from the very serious objections to which the tin collar is open, viz., the liability to be detached from the shell, secondly, the impracticability of making up the tin collars in the Field, the time and labour required to prepare them, and further, their great comparative expense; the grummet on the reverse is made up with despatch and facility by the Lascars attached to a Battery, is more securely attached to the shell than the tin collar, and is prepared at a very trifling cost.

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2. I beg also to submit a pattern of the Carwah cartridge bags and have entered in the margin, the name by which I understand it is recognised in the Presidency Bazar; at Secunderabad I believe the cloth, as in Bengal, is termed "Carwah" or "Red."

Carwah Tamil—Red.

FORWARDED.

1	1	24	Pdr.	Shell	Common,	Tin collar, Bengal.
	1	12	,,	,,	,,	
2	1	24	,,	,,	,,	Present pattern, Madras Grummetting.
	1	12	,,	,,	,,	
3	1	24	,,	,,	,,	Proposed Grummetting.
	1	12	,,	,,	,,	
4	1	24	,,	Canister	,,	Bengal.
	1	12	,,	,,		
5	1	24	,,	,,		Madras.
	1	12	,,	,,		
6	1	6	,,	,,		Bengal.
	1	6	,,	,,		Madras.

ARSENAL, Fort St. George, *9th October*, 1850.

(Signed) F. F. WHINYATES, Lieut. Col.
Principal Commissary of Ordnance.

Memorandum showing the quantity of Materials and number of Workmen required for making up Collars Tin for 24 and 12 Pounder Shells.

ARTICLES.	Number.	MATERIALS.				WORKMEN.	
		Tin Single.	Pewter Solder.	Rosin.	Charcoal.	Tin Men.	Bellows Boys.
		Sheets.	Pollams.	Pollams.	Bushels.	For 1 Day.	For 1 Day.
Collars Tin for 24 Pdr. Shell,.....	30	15	3½	1¼	¼	3	1
,, ,, ,, 12 ,, ,,	36	10	3	1	¼	3	1

ARSENAL, Fort St. George, *9th October*, 1850.

(Signed) F. F. WHINYATES, Lieut. Colonel,
Principal Commy. of Ordnance.

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Memorandum showing the quantity of Materials and number of Workmen required for making up Grummetted Shells 24 and 12 Pounders.

	Number.	Materials.			Workmen.	
		Skins Sheep raw without Hair.	Rope Europe 2 Ins. unserviceable.	Corrosive Sublimate.	Lascars.	Chucklers.
		No.	Feet.	Drams.	1 Day.	1 Day.
Shells Common, 24 Pdrs.....	30	7½	40	1	2 *	2 *
„ „ 12 „	30	6	30	1	2	2

* N. B.—2 Lascars and 1 Chuckler will Grummet 50 in one day, if the Grummet Rope is ready to hand.

Arsenal, Fort St. George, *9th October*, 1850.

(Signed) F. F. Whinyates, Lieut. Colonel, *Principal Commy. of Ordnance.*

Opinion.—The Committee before giving an opinion on the pattern of common and spherical case shells to be used in this Presidency, think it desirable that information should be obtained from Bengal and Bombay as to the reasons for preferring tin collars to grummetting. With the present insufficient data before them, they see no reason for disturbing the opinion given on this point and the Canister by the Select Committee in Meeting 129, and Article 380, especially as tin collars have been, they understand, successfully used in the other Presidencies.

2. The pattern of the Carwah Cartridge bag is laid before the Committee, and appears to be in accordance with the pattern approved of in Select Committee Proceedings, Meeting 129, Article 380.

3. The Committee consider that the hammer wrench is too useful an article of equipment to be abolished: it may be a

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subject of consideration on the score of economy and manufacture, whether this article should not be procured from England.

ARTICLE 591.

Assimilation of the Calibres of the 4⅘ and 5⅓ Inch Mortars or Howitzers to the 12 and 24 Pdr. Bores.

Letter No. 5497, *from the Secretary Military Board, to the Brigadier Commandant of Artillery, dated Fort Saint George, 27th September,* 1850.

The Military Board at Calcutta having intimated that the Brass Ordnance as per margin, will shortly be sent from the Foundry for the service of this Presidency, I have now the honor by order of the Military Board to request you will favor them with your opinion as to the propriety of either setting aside such Brass Ordnance as will not admit of being used with the largest shot or shell of their calibre, or very nearly approaching it, or reaming up all the 4⅘ and 5⅓ Inch calibres of the Mortars or Howitzers in the Madras Presidency to the 12 and 24 Pdr. bores, which the Board have ascertained can easily be done in the Arsenal.

9	Pdr. Guns	of 10 Cwt.	N. P.	42
24	,,	Howitzers of 10 Cwt.	N. P.	20
6	,,	Guns		46
12	,,	Howitzers		8
3	,,	Guns Mountain Train	N P.	18
4⅘	,,	Inch Howitzers Mountain Train 12 Pdr. bore		14
5⅓	,,	Mortars N. P. 24 Pdr. bore		9
4⅘	,,	,, N. P. 12 ,, ,,		24

2. The Board are of opinion that less injury will result to the service from a casual use of a small ball in large bore than from the equally likely occurrence of a large ball being by mistake sent for the small bore, in the former case, a little of the accuracy and velocity is lost, in the latter, if a shot or shell jams, the use of the piece is endangered.

3. The Board, therefore, adverting to the fact that the 24 Pdr. gauges are 5·639 for the high (5·48 for the low) gauge,

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and that there is therefore always a chance that a shot or shell may have that diameter, are inclined to think that the high viz., 5·639 with the addition of minimum windage (carronade) 0·041, making a total of 5·68 (the carronade bore of a 24) should be at once fixed as that to be not only in future, but now, the minimum calibre of all Guns, Howitzers, Carronades, and Mortars, whether designated 24 Pounder or 5½ Inches.

4. To carry out this, it would be necessary to ream out, or to replace all the Brass 5½ Inch Mortars and Howitzers in the service, whether measuring as said in the Aide Memoire 5·62 in calibre, or as said in the Artillery Drawings, Plate 10, measuring 5·6. In either case, very little need be reamed out, but it is objectionable to allow such valuable pieces to run the risk of being accompanied by shells or shot (a hair's breadth only) too large to enter the muzzle.

5. If a Mortar has calibre 5·6 and a shot should be offered of the high gauge 5·639, it is absolutely impossible to fire it, as it would not go into the bore, by being too high by 0 039 or about $\frac{4}{100}$ of an inch.

6. In like manner the 12 Pdr. high gauge is 4·54 (the low gauge 4·432): none of the pieces, called the 4⅝ Inch should exist, which would not admit a shot of diameter 4·54, yet the Mountain Train Howitzer of the Royal Artillery, and many of our own, have 4·52 for their calibre, being $\frac{2}{100}$ of an inch less than the high gauge of shot, viz. 4·54 and the Board think it would be advisable at once to ream up all the 4⅝ Inch to the 12 Pdr. Howitzer bore viz. 4·58 or in preference to 4·56 being somewhat less than the Carronade of this calibre which is 4·576.

7. Should you after reference to the Artillery Select Committee, approve of this very useful assimilation, the Board will then issue instructions for all shot and shells in Arsenals, as in Regimental charge, for the 12 Pdr. or 4⅝ Inch, and for the 24 Pdr. or 5½ inch to be carefully re-gauged with the

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high and low gauges of the 12 and 24 Pdrs., and rejecting and setting aside all projectiles which do not pass through the gauges, viz.:

	High.	Low.
12 Pounder,	4·54	4·432
24 Pounder,	5·639	5·48

stripping all shot and shells fixed to bottoms, so as to prevent the possibility of any mistake and ordering all pieces whether Howitzers or Mortars not measuring for the

	Inches.
12 Pounder or 4⅝ Inch,	4·56
24 „ or 5½ „	5·68

to be sent to the Grand Arsenal and Indents forthwith forwarded for other pieces to replace them.

Opinion.—The Select Committee are of opinion that an assimilation of the calibres of the Howitzers, and Mortars is a very desirable object, and recommend that this should be carried out in the way proposed by the Military Board, viz., by reaming up the 24 Pdr. Howitzer and 5½ Inch Mortar to 5·68 and the 12 Pdr. and 4⅝ Inch Howitzer and 4⅝ Inch Mortar to 4·56, provided it be found not to interfere with the efficiency of the Corps, it being within the knowledge of several of the Committee that there is a very large proportion of shells in various Arsenals below the existing standard.

Minute by Major J. W. Croggan.

I dissent, being of opinion that further information on the subject is required.

(Signed) J. W. Croggan, Major.

29th *November*, 1850.

Letter No. 7048, *from the Secretary Military Board, to the Brigadier Commandant of Artillery, dated* 17*th December*, 1850.

I have the honor to acknowledge the receipt of the report of the Artillery Select Committee, in Meeting 166, Article 591,

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of date 28th November, 1850, recommending as a desirable object, an assimilation of calibres of Howitzers and Mortars, by reaming up the 5½ Inch and 4⅘ Inch pieces of those calibres, to the 24 and 12 Pdr. Howitzer bores respectively.

2. The Board fully approve of the recommendation, and consider the suggestion of the Committee in regard to the shells for these pieces, to require the attention of all Ordnance Officers, who will be called on to re-gauge every shell in use with the Regiment of Artillery, and in Ordnance Departments, separating those for the different calibres, and to be entered in the books under the right denominations.

3. You are requested to cause the Board's letter, No. 5497, to form part of the Committee's Proceedings.

ARTICLE 592.

ADVISABILITY OF HAVING AN EXPERIMENTAL 6 POUNDER CARRIAGE AND LIMBER WITH REDUCED IRON WORK MADE UP OF TEAK.

The Military Board forward[a] copy of an Abstract of the replies of six of the leading Coach makers of Madras to queries put to them relating to the question of the fitness of certain woods for the various parts of Carriages and wheels, and request the same may be submitted to the Artillery Select Committee, together with specimens of the woods, for their report.

[a] No. 6037 22d Oct. 1850.

The following documents are laid before the Committee.

Letter from the Secretary Military Board, to the Brigadier Commandant of Artillery.[b]

[b] No. 5494, 24th Sept. 1850.*

* Page 86.

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Memorandum of the different Description of Woods used by the undermentioned Coach Builders for Carriages purposes.

Component parts of Carriages.	Messrs. Bredin and Gregory.	Messrs. Simpson and Co.	Mr. J. Wilder.	Messrs. Hider and Co.	Mr. A. Aubry.	Mr. J. Maddox.	Majority of opinions in favor of.
Spokes, - -	Trincomallee wood.	Trincomallee wood.	Trincomallee wood.	Trincomallee wood. Soondry wood.	Trincomallee wood.	Trincomallee wood.	Trincomallee wood.
Splinter Bars, -	Trincomallee wood.	Do.	Do.	Trincomallee wood.	Do.	Do.	Trincomallee wood.
Poles, - - -	Do.	Trincomallee wood. Currevalen wood.	Do.	Do.	Do.	Do.	Trincomallee wood.
Perches, - -	Do.	Do. Do.	Do.	Cottavala marum.	Valinwood. Trincomalle wood.	Do.	Trincomallee wood.
Felloes, - -	Teak wood.	White Chittagong. Currevalen wood.	Ascanam wood.	Chittagong Sissoo.	Teak wood. White Chittagong	Teak Tumacara Red and White Chittagong & Assanay.	Teak or Chittagong.
Naves, - -	Satin wood.	Satin wood.	Satin wood.	Satinwood. Cotavala marum.	Bastard Satin.	Satin wood.	Satin wood.

MILITARY BOARD OFFICE,
Fort Saint George,
22d October, 1850.

(Signed) P. ANSTRUTHER,
Secretary Military Board.

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Letter No. 6035, *from the Secretary Military Board, to the Principal Commissary of Ordnance, dated 22d October*, 1850.

The Military Board having lately applied to six of the leading Coach-makers at Madras for information connected with the woods used by them in construction of wheels and other parts of carriages, I have the honor to enclose in abstract copy of their replies, and to acquaint you that the Board wish you to obtain pieces of the following, and any other woods of such scantling as may allow of actual experiments being made.

Teak.	Makes sound good *Felloes* if of close and hard grain.
Trincomallee.	Cut into slabs to season and dried *for Spokes* ever proved sound and good, and for *Splinter Bars, Perches,* and *Poles* very good and for these mostly in use, decidedly the best for Poles and Splinter Bars, best for strength as Cottavala Marrum is for curved purposes.
Tinnacara Babool, in Tamil Kawtoo Voya. Hard Red Chittagong, or Elappa Marrum, and White Chittagong. Assany Wood.	For *Felloes,* but the red and white Chittagong woods are perhaps preferable but laborious to the workmen, white Chittagong if procurable preferable to Teak.
Satin Wood.	Decidedly the best for Naves, hard jungle wood if selected might be employed to great advantage for *Splinter Bars, Perches* and *Poles.*
Currevalen Wood.	A jungle wood, very hard and tough, answers well for *Felloes, Poles, Perches.*
Ascanam Wood.—For Felloes.	
Bastard Satin Wood.	*Naves,* if turned to the size and bored or morticed and set aside for a couple of months, by which process the sap being then recovered is then fit to receive the spokes.
Valin Wood.	For *Perches, Spring bed,* axle-bed, and *Horn bars,* found to be the best wood for the above, and in the absence of this, Trincomallee of the toughest kind used.
Soondry.	Obtainable from Sunderbunds, Bengal, is preferable for *Spokes,* next Trincomallee, Soondry is best for straight purposes as Sissoo for curved purposes.

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Sissoo. { Superior for *Felloes* to Chittagong, best for curved as Soondry is for straight purposes.

CottavalaMarrum. { Preferable to Satin wood for *Naves*, although more difficult to work, also for *Perches*, this wood is best for curved purposes as Trincomallee is for straight purposes.

Enclosed are the originals from which the above information is extracted and the Board suggest the advantage of having the Native names of the tree written on the specimens, and that you should request Dr. Neil, M. D., before embarkation for England to furnish you with the Botanical names of these woods.

You may perhaps find two or more names for the same wood, and probably you may have some difficulty in procuring large pieces, but the Coach-builders who have so readily furnished the information may be induced to supply pieces sufficient as specimens.

The Board will request the Commissary General to afford every facility in procuring the woods, and the indent for the quantities obtained will be immediately passed, I shall address Dr. Neil to give his assistance in designating the woods by their nature and Botanical names, as well as the common names by which known at Madras.

A copy of this communication will be forwarded to the Brigadier Commandant of Artillery, with an intimation that specimens of the woods will be forwarded by you to be laid before the Select Committee, to whom the question of the application of different kinds of woods, for different parts of Carriages will again* be referred.

* Artillery Select Committee Proceedings, Article 405, in Meeting 133, 30th May, 1846, Boar'ds letter, 15th May, 1846, No. 1845.

The Board will be happy to authorize you to carry on any experiments you may wish either by constructions or by testing, and 4 wheels have been ordered from the Field Train, three as musters to Coach-makers, and one for your own use.

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OPINION.—The Committee having perused the correspondence, have directed the same to be entered in their Proceedings.

2. With reference to the 3d para. of the Military Board's letter, No. 5494*, dated the 24th September, 1850, the Committee are of opinion that it would be advisable to have an Experimental 6 Pounder Carriage and Limber with reduced Iron work made up of Teak wood of the Artillery Select Committee Pattern.

ARTICLE 593.

EXPERIMENTS WITH A WROUGHT IRON CARRIAGE FOR 4⅘ INCH HOWITZER CONSTRUCTED FOR SERVICE IN CHINA IN 1842.

(a) No. 4263 3d Aug. 1850.

The Military Board direct [a] that the Experiments which have taken place of using a 5½ Inch Mortar, 6 Pdr. Gun, 9 Pdr. Gun of 10 Cwt., and a 9 Pdr. Carronade on the wrought Iron Carriage* constructed for the 4⅘ Inch Howitzer in 1842 for service in China weighing

* No. 1 of 1842.

Carriage, ...	5 0 18
Limber,.....	4 3 20
Total...	10 0 10

be laid before the Artillery Select Committee for report.

The following Documents are laid before the Committee.

1. *Letter No.* 99, *from the Brigadier Commandant of Artillery to the Secretary Military Board, dated 22d February,* 1850.

I do myself the honor to request the sanction of the Military Board for submitting to the established Proof, the wrought Iron Carriage for the 4⅘ Inch Howitzer with a 6 Pdr. Gun.

* Page 87.

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2. This Carriage is of such heavy dimensions, that the Director of the Artillery Depôt has suggested its proof with a 6 Pdr. Gun being made, to which I see no objection.

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2. *Letter No.* 310, *from the Brigadier Commandant of Artillery, to the Secretary Military Board, dated* 8*th May*, 1850.

It will be in the recollection of the Military Board that certain small Howitzer Carriages were constructed under their orders in the year 1842, intended for the use of the Madras Artillery serving in China, among them was an Iron 4⅘ Inch Howitzer Carriage weighing Cwts. 5-0-8 and its Limber Cwts. 4-3-20 which is now in the Field Train.

2. This Carriage has never been brought into use, nor is it likely to be an efficient one for service purposes, on account of its great weight.

3. It has undergone proof with a 4⅘ Inch Howitzer, with a 5⅕ Inch Mortar and with a 6 Pdr. Gun.

4. At the solicitation of the Director of the Artillery Depôt, I am induced to recommend for the sanction of the Military Board that this Carriage be now partially adapted* to a 9 Pdr. Gun to enable an experimental proof of it being made with a 9 Pdr., and service charge: the alteration will not be attended with any great expense, as it will only be necessary to open out the cheeks ·93 of an inch, to enlarge the trunnion holes ·4 of an inch, which I would recommend being taken from the front of the trunnion holes; with regard to the elevating screw, that might remain as it is, the elevation being given when proving the Gun by quoins.

*At the Gun Carriage Manufactory.

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3. *Letter No.* 481, *from the Brigadier Commandant of Artillery, to the Secretary Military Board, dated* 31*st July*, 1850.

Reporting that the Carriage having stood proof with the

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9 Pdr. Brass Gun, that it had been sent to the Gun Carriage Manufactory for the purpose of having an Iron 9 Pdr. Carronade fitted to it in accordance with the Board's[a] orders.

(a) Letter No. 2152, 3d May, 1850.

4. *Practice with a 5½ Inch Mortar mounted on a 4⅘ inch Howitzer Iron Carriage.*

5. *Proof Report of a 4⅘ inch Howitzer Iron Carriage with a 6 Pdr. Gun placed upon it.*[b]

(b) 4th March 1850.

6. *Do. do. with a 9 Pdr. Gun placed upon it.*[c]

(c) 30th July 1850.

7. *Do. do. with a 9 Pdr. Carronade placed upon it.*[d]

(d) 4th Nov. 1850.

OPINION.—The Committee are of opinion that the Carriage in question has fuly answered the purpose for which it was constructed. They do not, however, recommend its *general* adoption but that it should be reserved for those special cases which first led to the idea of its construction.

ARTICLE 594.

ON THE CONSTRUCTION OF CARRIAGES OF TEAK WOOD WITH REDUCED IRON WORK.

The Military Board request[a] the opinion of the Select Committee with reference to their Proceedings[b] on the subject of a 12 Pdr. Howitzer Ammunition Waggon and Limber constructed of Peddowk wood of reduced dimensions in Iron and wood work, whether the reduced Iron work for the Peddowk Carriage may not also be applicable to Carriages constructed of Teak wood. The Military Board also request the Committee will furnish them with a detailed Statement of the reductions in Iron work as now applied to Peddowk and applicable to Teak Carriages.

(a) No. 5895,* 18th Oct. 1850.

(b) Meeting 162, Article 583, Page 95.

* Vide page 108.

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OPINION.—The Committee are of opinion that it is desirable to have a waggon with reduced Iron work agreeably to accompanying Table* made up of Teak wood.

ARTICLE 595.

PINTLE LOOP, PROPOSED BY CAPTAIN J. MAITLAND, SUPERINTENDENT GUN CARRIAGE MANUFACTORY.

The Military Board direct a communication[a] from the Superintendent Gun Carriage Manufactory, accompanied by Drawings, Plates 27, 28 and 29, and a Statement showing the dimensions and weights of the Pintle Loops and Hooks of the several Patterns of Gun Carriages, as also a swivel loop without the neck, constructed by the Superintendent, to be laid before the Permanent Artillery Select Committee for their report.

(a) No. 816, 20th Nov. 1850.

A 9 Pdr. Carriage fitted up with the proposed Pintle Loop without the neck, as proposed by Captain Maitland is submitted for the inspection of the Committee.

OPINION.—The Committee consider the proposed Pintle Loop to be a great improvement, and recommend its adoption in all future constructions.

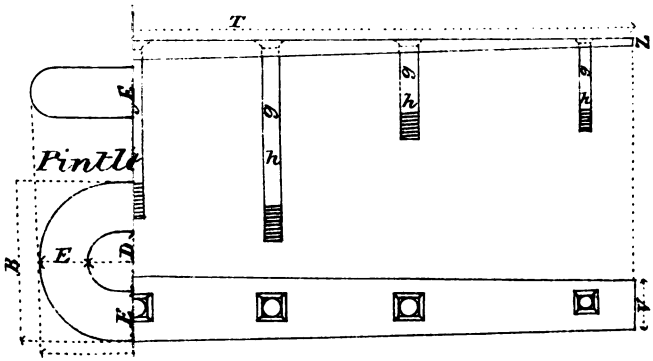
The advantages to be derived from it are additional strength, slight diminution of weight, and a facilitating of draught by bringing the two trains somewhat closer together.

* Vide pages 100 to 105 inclusive.

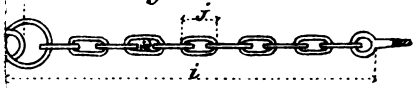
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And 12 and 24 Pdr Howitzers.

Pintle Hook.

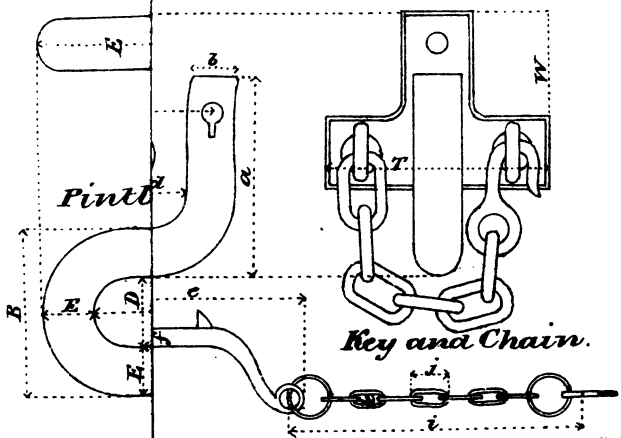


Key and Chain.



G. Od 24 Pdr Howitzers.

Pintle Hook.



Madras

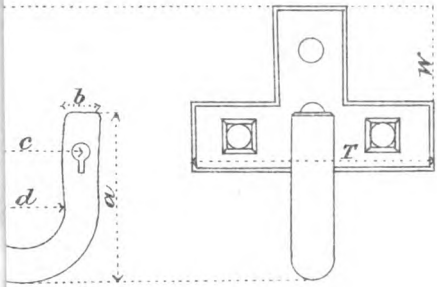
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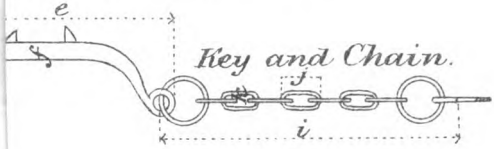
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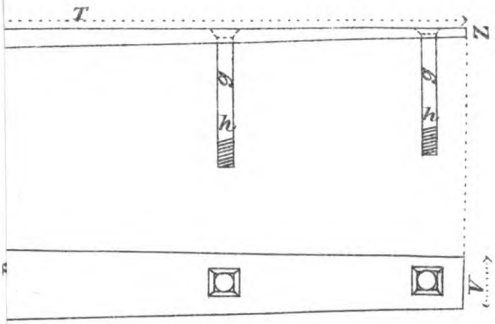
12 and 24 P^dr Howit^rs.

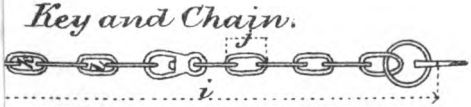
Pintle Hook.





and 24 P^dr Howitzers.



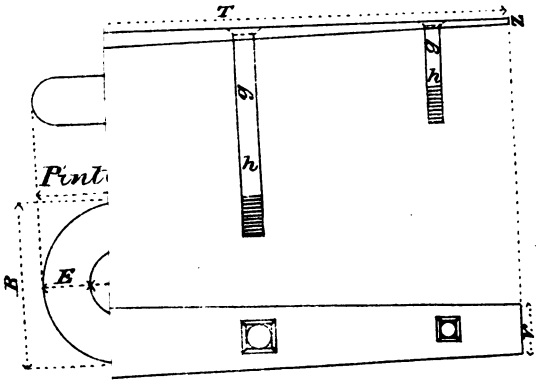


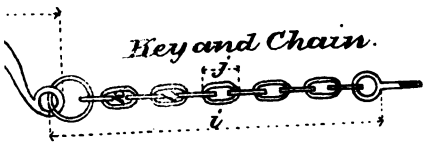
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Plate 29.

Cap[illegible] 24 Pdr Howitzers.
[illegible]le Hook.





3/4 feet.

C.B.

Ma

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Statement of the Dimensions and Weights of Pintle Loops and Pintle Hooks with Plates, Bolts, Keys and Chains of the following Patterns.

	Swivelled or fixed.	Pintle Loop. A Length.	B Breadth.	C Length of Loop Hole.	D Breadth of Loop Hole.	E Thickness of Loop Iron.	F Length of upper Trail Plate.	G Length of lower Trail Plate.	H Breadth of Trail Plate.	I Depth of Trail end Plate.	J Thickness of Trail end Plate.	K Thickness of upper Plate at the rear.	L Thickness of upper Plate at the front.	M Thickness of lower Plate at the rear.	N Thickness of lower Plate at the front.	O Length of side Plate.	P Thickness of side Plate at the rear.	Q Thickness of side Plate at the front.	R Length of Plate Bolts.	S Diameter of Plate Bolts.	Pintle Hook. T Length of Plate.	U Breadth of Plate at the rear.	V Breadth of Plate at the front.	W Depth of Plate.	X Thickness of end Plate.	Y Thickness of Plate at the rear.	Z Thickness of Plate at the front.	a Length of Hook from bottom of Plate.	b Diameter of Hook Iron.	c Distance between point of Hook and Plate.	d Interior curve of Hook.	e Length of Key.	f Diameter of Key.	g Length of Bolts.	h Diameter of Bolts.	i Length of Chain.	j Length of Link.	k Breadth of Link.	l Thickness of Link.	Weight of Pintle Hook. lbs.	ozs.
		Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	lbs.	ozs.
4 S. C. ptn. for 6 & 9 Pdr. Guns and 12 & 24 Pdr. Howitzers.	Swivelled.	11⅛	6⅜	3¾	2¾	2	17⅜	19¾	4	4	5/8	⅝	⅜	¾	¼	0	0	0	9/8	7/8	21	13	3⅜	2	6	1	⅜	⅛	8½	2⅛	3¼	2⅛	9	⅞	7⅛	¾	20	1⅝	1	3/16	40	—
S. B. pattern for 6 & 9 Pdr. Guns. & 12 & 24 Pdr. Howitzers.	Swivelled.	8¼	5⅜	3	2	1½	16	15	4¼	5/8	⅝	6/10	2/10	¾	2/10	0	0	0	9/8	7/8	10	6	10	0	7	8/10	⅜	⅛	8¾	2⅛	3¼	2⅛	7/8	⅞	8⅛	¾	12½	1¼	7/8	3/16	17	9
O. O. G. 1842 ptn. for 6 & 9 Pdr. Guns & 12 & 24 Pdr. Howzrs.	Fixed.	10⅝	7	4	3	2	17½	19	5	0	⅞	7/8	¼	1	¼	14	5/8	0	9/8	7/8	56	12	9 3/10	0	0	0	0	0	8⅜	2⅛	3¼	2⅛	1	1	8⅛	¾	15	1	⅞	3/16	19	0
Col. Cullen's pattern for 6 & 9 Pdr. Guns & 12 & 24 Pdr. Howitzers.	Swivelled.	11⅞	6⅜	3¾	2¾	2	0	0	7¼	4¾	⅞	⅞	0	0	0	0	0	0	9/8	7/8	21	10	33	2¼	5⅜	1⅜	0	0	8⅜	2⅛	3¼	2⅛	1	1	8⅛	¾	20	1⅝	1	3/16	41	14
Capt. Maitland's pattern for 6 & 9 Pdr. Guns & 12 & 24 Pd. Howitzers.	Swivelled.	10⅛	6⅜	3¾	2¾	2	17	19	3¼	4	⅜	⅜	⅛	¼	5/8	3/16	0	0	0	7/8	7/8	20	0	24	3⅛	2	1	¾	⅛	8⅜	2⅛	3¼	2⅛	1	1	8⅛	¾	19⅜	1⅜	1	⅜	29	9

(Signed) J. Maitland, Captain,
Supt. Gun Carriage Manufactory.

Gun Carriage Manufactory, }
Madras, 20th November, 1850. }

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ARTICLE 596.

CARRIAGE FOR LIGHT 9 POUNDER GUN, FITTED UP WITH A CRADLE TO ADAPT IT TO RECEIVE THE HEAVY GUN OF 10 CWT.

The Military Board direct* that the 9 Pdr. Gun Carriage fitted up with a Semelle and Cradle, and reported on by the Select Committee† be sent to the Manufactory to be fitted with a cradle without the Semelle, so as to support the elevating screw in the one position required for a heavy 9 Pdr. Gun of 10 Cwt; the Carriage to be afterwards subjected to a severe proof, and should it stand, be submitted to the Select Committee and reported on with a view of adapting all these Carriages originally intended for the lighter piece, to receive only the heavy Gun of this Calibre.

* No. 6032, 25th October, 1850.

† Meeting 164, Article 587, Page 126.

The Carriage having been submitted to a proof of 30 rounds, viz.:

10 rounds at P. B.
10 „ at Medium } Elevation.
10 „ at Highest }

without sustaining any injury, or the cradle shifting in the slightest degree as shown in the annexed Proof Reports.

OPINION.—The Committee are of opinion that the Cradle will fully answer the purpose for which it is intended.

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SUPPLEMENT TO ARTICLE 590 "ON CERTAIN BENGAL PATTERN STORES," PAGE 139.

Letter No. 8, from the Secretary Military Board, to the Principal Commissary of Ordnance, dated 17th December, 1850.

With reference to your letter No. 911 of date 14th September 1850, and to the Board's letter No. 5312 of date 20th September (copy forwarded to you) I have now the honor to enclose the original Proceedings of the Artillery Select Committee in Meeting 166, Article 590, reporting on the different Articles of Ordnance Equipment brought to the Board's notice by Lieutenant Colonel Whinyates.

2. The Board request that you will cause a supply of shells and Spherical Case Shot in equal numbers with Grummets and Tin Collars, to be prepared in the Arsenal and to issue these in equal proportions to the Artillery at Saint Thomas' Mount, and dispatch some of each both to Bangalore and Secunderabad, to be there used by the Artillery at practice and to be kept in Waggon and Limber Boxes with a view to test the efficiency of the Tin Collars and Grummets both in firing and travelling, you are requested to communicate instructions to the Commissaries of Ordnance at Bangalore and Secunderabad on the mode of fixing the Grummets and applying the Tin Collars.

3. The Officer Commanding Artillery and Ordnance Officers at Secunderabad and Bangalore and the Officers Commanding Batteries and Battalions at St. Thomas' Mount will be requested to send in every 3 months reports on these shells with a view to the Select Committee finally reporting on them at the expiration of the year 1851.

4. You are requested to send a muster Carwah Cartridge to each Ordnance Department and forward to this Office a Memorandum of the names by which this Article of Ordnance Equipment will be brought on the stock Book of this Office.

5. The Board are of opinion that the preparation of a good Paulin is deserving of your attention.

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6. With the opinion of the Artillery Select Committee in favor of a Hammer Wrench it will be expedient for you to send a muster to each Ordnance Department unless you deem it advisable to make them up at Madras and furnish Out-stations with supplies for issue to meet existing demands.

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SELECT COMMITTEE PROCEEDINOS, 1851.

MEETING 167.

EXTRACT FROM THE PROCEEDINGS OF THE PERMANENT ARTILLERY SELECT COMMITTEE, ASSEMBLED BY ORDER OF COLONEL G. CONRAN, BRIGADIER COMMANDANT OF ARTILLERY.

Artillery Depôt, St. Thomas' Mount, 3d February, 1851.

Present.

LIEUT. COL. F. BLUNDELL, C. B., *Principal Commissary of Ordnance.*
LIEUT. COL. P. HAMOND, *Commanding 5th Battalion Artillery.*
LIEUT. COL. H. S. FOORD, *Commanding 4th Battalion Artillery.*
CAPTAIN T. LAVIE, *Superintendent Gun Powder Manufactory.*
CAPTAIN J. MAITLAND, *Superintendent Gun Carriage Manufactory.*
CAPTAIN A. F. OAKES, *Director Artillery Depôt.*
CAPTAIN B. W. BLACK, *Assistant Adjutant General of Artillery.*

ARTICLE 597.

GUN BUCKET, MADE OF GUTTA PERCHA.

A Gun Bucket made of Gutta Percha forwarded by Lieutenant Harrison, of the Artillery, from Singapore is submitted, by order of the Military Board [a] for the report of the Artillery Select Committee.

[a] No. 6640, 26th Nov. 1850.

OPINION.—This Bucket cannot possibly answer the purpose contemplated; several parts having given way during its examination by the Committee. The handle was bent without any great force being used, and the lid fastenings gave way immediately upon taking off and replacing the lid; the chains on the handles broke at once on the slightest force

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being applied; when the Committee examined the bucket it had only been exposed to the heat, &c. for five days.

ARTICLE 598.

Advantages or otherwise of Cradled Transoms for Double Cheek Pattern Carriages.

On a letter from Major P. Anstruther, C. B., 4th Battalion Artillery, to the Director Artillery Depôt, (a) requesting that the opinion of the Artillery Select Committee might be obtained, with reference to their Proceedings(b) on the subject of a Gun Carriage of Colonel Cullen's pattern, constructed for a light 9 Pdr., and having the elevating screw supported by means of a cradle, so as to adapt it to receive a Heavy Gun of the same calibre; whether, in all cases of double cheek trails, it would not be beneficial to the service if the present transoms were removed, and *cradled* transoms substituted for them: submitted to the Permanent Artillery Select Committee by order of the Commandant of Artillery.

(a) Dated 5th Dec. 1850.

(b) Meeting 164, Article 587.*

Opinion.—The Committee do not consider that it would be advantageous to the Service, that the present transoms should be removed from the double cheek pattern Carriages, for the purpose of having cradled transoms substituted for them; no inconvenience having hitherto been experienced from the present mode of fitting the elevating screw transom, as adopted in Colonel Cullen's pattern, and sanctioned by the Board of Artillery Officers of the three Presidencies in 1838, for the Special Board Pattern; especially, as the alteration would entail a very great, and unnecessary expense on Government, there being at present upwards of 200 Carriages of the above description, either in use with the Regiment or in Arsenals.

* Page 126.

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ARTICLE 599.

Experimental Wrought Iron Carriages for 3 Pounder Gun and 4⅘ inch Howitzer, proposed by Captain A. F. Oakes.

(a) No 5818,18th October, 1850.

The Military Board direct[a] that the Experimental Carriages proposed by Captain A. F. Oakes, viz.

Carriage, Iron, for a Brass 3 Pdr. Mountain Train Gun,

Carriage, Iron, for a Brass 4⅘ Inch Mountain Train Gun,

recommended to be constructed by the Permanent Artillery Select Committee,[b] having been completed, be subjected to the regular Proof and reported upon.

(b) Meeting 161, Article 574, 6th June 1850.*

The following documents are laid before the Committee.

1. *Two Statements showing the weights of the component parts of the 3 Pdr. Gun and 4⅘ Inch Howitzer Carriages.*[c]

(c) Dated 9th October 1850.

2. *Proof Report of do. do. do. which show these Carriages to have stood Proof uninjured.*[d]

(d) dated 3d January, 1851.

The weight of the 3 Pdr. Gun is

		Cwts.	qrs.	lbs.
Body	lbs. 138			
Wheels	„ 137			
Shafts	„ 69			
Total	344 or	3	0	8

The weight of the 4⅘ inch Howitzer is

		Cwts.	qrs.	lbs.
Body	lbs. 145			
Wheels	„ 67			
Total	212 or	1	3	16

* Page 55.

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Statement of the Weights of the Component Parts of an Iron Carriage for a Brass 3 Pdr. Mountain Train Gun, proposed by Captain Oakes, constructed at the Gun Carriage Manufactory in the month of August, 1850, by order of the Military Board, No. 3451, dated 5th July, 1850.

No. of the Component parts.	Names of the Component Parts.	Weight. lbs.	Weight. ozs.	Remarks.
	IRON WORK.			
1	Right Cheek,	31	13	
1	Left Cheek,	30	11	
1	Axletree,	36	7	
2	Linchpins,	0	9½	
2	Axletree end Washers,	0	12	
2	Capsquares,	2	8	
4	Forelock Keys with Chains,	0	14	
2	Cheek side Bolts,	3	2	
4	Nuts octagonal for do.	0	15	
1	Elevating Screw,	6	2	
1	,, Handle,	0	13½	
1	,, Rivet Washer,	0	6	
1	Collar hoop attached to elevating Screw,	2	4½	
2	Rivets for do.	0	1	
1	Breech Plate for do.	0	15	
2	Bolts Rose Head for do.	0	4½	
2	Nuts octagonal for do.	0	1½	
1	Bolt rose head for do.	0	3	
1	Nut octagonal for do.	0	1	
1	Trail Plate,	11	6	
1	Transom,	4	15½	
24	Bolts Nave,	5	12	
24	Nuts, ,,	0	12	
2	Shafts bottom Plates,	33	12	
2	,, side exterior Plates,	4	5½	
1	,, side interior Plate,	3	4½	
2	,, top Plates,	1	2½	
2	,, circular Plates,	1	5½	
4	Rivets for shaft Plates,	0	3½	
	Carried over..	185	14½	

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No. of the Component parts.	Names of the Component Parts.	Weight. lbs.	Weight. ozs.	Remarks.
	Brought over..	185	14½	
2	Bolts Rose Head for Shaft Irons,.....	1	15	
2	Keys for do.	0	1½	
6	Studs for Shaft bottom Plates,.....	0	14	
2	Hooks Shaft,.....	0	9	
2	Nuts square for Shaft,.....	0	1	
2	Tires,.....	52	0	
12	Tire Nails,.....	0	6	
52	Screws 1¾ inch,.....	1	1	
46	„ 1 „	0	6½	
	Brass Work.			
1	Elevating screw Box,.....	4	6	
2	Naves,.....	29	3	
	Wood Work.			
12	Felloes,..... ..... }	50	10	Malabar Teak.
24	Spokes,..... }			Trincomallee.
1	Pair Shafts,.....	26	0	Pegue Teak.
	Total...	353	7½	

Total weight of Body... lbs. 138
„ „ of 2 wheels... „ 137
„ „ of 1 pair shafts, „ 69
Total „ 344 or 3 cwts. 0 qrs. 8 lbs.

Gun Carriage Manufactory, Madras, 9th October, 1850.

(Signed) J. Maitland, Captain,
Supt. Gun Carriage Manufactory.

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Statement of the Weights of the Component parts of an Iron Carriage for a 4¼ Inch Brass Howitzer, proposed by Captain Oakes, constructed at the Gun Carriage Manufactory in the month of August, 1850, *by order of the Military Board, No.* 3451, *dated 5th July,* 1850.

No. of the Component parts.	Names of the Component parts.	Weight. lbs.	Weight. ozs.	
	Iron Work.			
1	Right Cheek,	38	4	
1	Left Cheek,	37	4	
1	Axletree,	40	5	
2	Capsquares,	2	15	
2	Trail eye Plates,	2	1⅛	
1	Trail Bolt,	0	15⅝	
1	Trail Rivet Bolt,	0	9	
1	Semelle Plate with Stud,	3	15½	
1	Semelle Bolt,	1	13	
4	Forelock Keys with Chains,	0	13	
2	Linchpins,	0	13	
1	Breast Bolt,	2	5	
6	Washers round Rivet for Bolts,	1	0	
2	Axletree end Washers,	0	13	
1	Elevating Screw,	1	14	
1	,, ,, handle,	1	6	
2	Ferrules for Semelle Bolt,	1	5½	
2	Tires,	18	15	
24	Bolts Nave,	4	9	
24	Nuts, ,,	0	12	
12	Screws 1¾ inch,	0	3½	
	Brass Work.			
2	Naves,	19	6	
1	Transom,	6	15	
	Wood Work.			
12 24	Felloes, Spokes,	23	2	Malabar Teak. Saul.
	Total..	212	6½	

Total weight of Body..... lbs. 145
,, ,, of 2 wheels..... ,, 67
Total.. ,, 212 or 1 cwt. 3 grs. 16 lbs.

Gun Carriage Manufactory, Madras, 9*th October*, 1850.

(Signed) J. Maitland, Captain,
Supt. Gun Carriage Manufactory.

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Report of a Proof of the undermentioned Experimental Iron Carriages by order of Colonel G. Conran, Brigadier Commandant of Artillery, directed to be made up by the Military Board in Letter No. 3451, 5th July 1850, in accordance with the recommendation of the Artillery Select Committee, in Meeting 161, Article 573, 26th June, 1850.

Description.	No. of Carriages.	No. of Firings.	Nature and Strength of Powder.	Marks on the Carriages.	Marks on the Ordnance.	Weight of Metal. cwts.	Weight of Metal. qrs.	Weight of Metal. lbs.	Weight of Carriage. cwts.	Weight of Carriage. qrs.	Weight of Carriage. lbs.	Charge. ozs.	Charge. drs.	Shot or Shell. lbs.	Elevation. D.	Elevation. M.	Recoil. Feet.	Recoil. Ins.	Time in Firing.	REMARKS.
Captain Oakes' Experimental Iron Carriage for 3 Pdr. Brass Gun.	1	5 5 5	Madras, April 1849—C. P. Pit pressed and glazed, P. A. Supl. 8 Inch Iron Mortar 1 lb. Proof Range 650 yards.	J. M. 1850, No. 1.	English and Co. fecit 1775.	3	0	13	2	1	23	12	0	3	P. 3 7	B. 45 30	10 12 11	0 0 0	40 Minutes.	The trail end during the firing at P. B., jumped about 8 inches from the ground and at the medium and highest elevation (the latter giving a range of 1900 yards) from 8 to 12 inches. The muzzle of the 3 Pdr. on this Carriage being on the trail side of the Axletree, the greater weight of the breech on the other side of the Axletree, acting as a counterpoise, prevented the trail from descending to the ground with any force. Upon the whole the recoil was steady. No injury was sustained by the Proof.
									without the shafts. *											
Captain Oakes' Experimental Iron Carriage for 4⅘ Inch Brass Howitzer.	1	5 5 5		J. M. 1850, No. 1.	W. & G. 1804.	2	1	25	1	3	16	8	0	8	P. 5 11 14	B. 5 30 0 0	5 7 9 13	0 0 0 0		This Carriage was very steady in its recoil. No injury was sustained by the Proof.

* Weight of shafts. 69 lbs.

N. B.—20 rounds were fired instead of 15 from the 4⅘ inch Howitzer in consequence of the semelle not admitting of more than 11° of elevation, when the Carriage first came from the Gun Carriage Manufactory a slight reduction of the friction point under the semelle having given 14 degrees, the extra 5 rounds at the latter elevation was given.

Artillery Depôt,
Saint Thomas' Mount,
3d January 1851.

(Signed) G. Conran, Brigadier,
Commandant of Artillery.

(Signed) A. F. Oakes, Captain,
Director Artillery Depôt.

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OPINION.—With reference to former Proceedings, Meeting 161, Article 574, 26th June, 1850, the Committee would wish to see the Mountain Train equipment completed, before they come to any decision, upon the introduction into the service, of these experimental Carriages; they would recommend to the Board, that the Director Artillery Depôt be permitted to make such further experiments, as he may deem expedient, to enable him at a future Meeting, to show how he proposes to transport the entire Mountain Train equipment alluded to by the Committee, in their Meeting of June last, above referred to.

2. All that is necessary, it would appear is, that a Pony be supplied for the use of the Committee, to be placed under charge of the Director Artillery Depôt for experiments, and that the Brigadier Commandant of Artillery be pleased to sanction bullocks being made available occasionally, until these experiments shall have been concluded, with the view of enabling Captain Oakes (the projector of the Carriages, Carriage Carts, and Ammunition Carts) to place the animals in draught, as well as to dispose of the weight to be drawn advantageously.

The following is a Statement of the Weights of the Beds and Carriages, which have been constructed up to the present time for the 4⅖ Inch Howitzer and 3 Pdr. Gun, including those now submitted to the Committee.

Nature and by whom recommended.	Year when Introduced	Weight.			Remarks.
		cwt.	qr.	lbs.	
4⅖ Inch Howitzer.					
Camel Bed, wooden (large)	——	2	0	8	
,, ,, ,, (small,)	——	1	1	23	
Carriage Wrought Iron, Capt. Maitland's.	1842	5	0	8	
,, ,, ,, Capt. Oakes'	1850	1	3	16	
3 Pdr. Gun.					
Carriage double cheek, old Pattern Wooden,	1822	7	0	6	
,, Colonel Cullen's Pattern,	1831	7	1	9	
,, Major Anstruther's Wrought Iron,	1842	3	0	5	
,, Artillery Select Committee Pattern, Wooden,	1849	8	3	14	
,, Captain Oakes' Wrought Iron.	1850	*2	1	23	Without shafts.

* This Carriage is so constructed as to be drawn by one Pony or one Bullock.

ARTILLERY DEPOT, St. Thomas' Mount, 3*d February*, 1851.

(Signed) A. F. OAKES, Captain, *Director Artillery Depôt.*

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Extracts from the Minutes of Consultation, No. 1224, 1*st April* 1851, *having reference to a letter from the Military Board, No.* 36, *dated* 18*th February* 1851.

The Right Honorable the Governor in Council grants authority for an Indent being submitted on the Commissary General for a Pony and harness, and other requisites for Mountain Train Draught to carry out the experiments alluded to in the foregoing letter.

ARTICLE 600.

BRASS COLLARS TO ENABLE A $4\frac{2}{5}$ INCH MORTAR BEING FIRED FROM A $5\frac{1}{2}$ INCH MORTAR BED.

(*a*) No. 37. From Supt. G. C. M. To Secy. Mily. Board. 14th January, 1851.

The Military Board direct that two Brass Collars (*a*) for enabling a $4\frac{2}{5}$ Inch Mortar, to be fired from a $5\frac{1}{2}$ Inch Mortar Bed be submitted to the Permanent Artillery Select Committee for their report.

OPINION.—The Committee recommend that, these collars be adapted to a $4\frac{2}{5}$ Inch Mortar and used on a $5\frac{1}{2}$ Inch Iron Bed, undergoing the usual Mortar Bed proof, and afterwards that the subject be again laid before them.

Extract from Letter No. 971, *from the Secretary Military Board, to the Brigadier Commandant of Artillery, dated* 24*th February,* 1851.

I am directed by the Military Board to request you will be good enough to subject both the collars to the usual proof, and then favor them with the opinion of the Committee.

2. The Superintendent Gun Carriage Manufactory is this day instructed to make up the collars and send them to you for the purpose.

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ARTICLE 601.

Drawings of the different pattern Axletrees for Light Field Ordnance Carriages.

(a) No. 141, 7th Jan. 851.

The Military Board forward (a) drawings of the different patterns of Axletrees, together with a lettered reference Table of their dimensions and weight, to be laid before the Artillery Select Committee, and call for any information which the same may suggest to them.

Opinion.—The Committee observe that the axletrees alluded to in the Board's letter above quoted, have already been published in the Artillery Records* except the following.

1. Cullen's 24 and 12 Pdr. Howitzer and 9 and 6 Pdr. Gun assimilated to the Artillery Select Committee pattern.
2. 24 Pdr. Heavy Howitzer, Madras pattern, &c.
3. The Medium 5½ Inch Howitzer pattern.

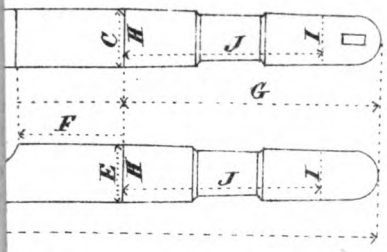
The Committee would propose publishing descriptions and drawings, (Plate 30) of the above named axletrees in continuation of the former set, with a reference to them, which will complete the information required.

* Select Committee Proceedings, Meeting 159, Article 554, 28th February 1850, Pages 19 and 77, and Plates 3, 4 and 24.

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...riages.

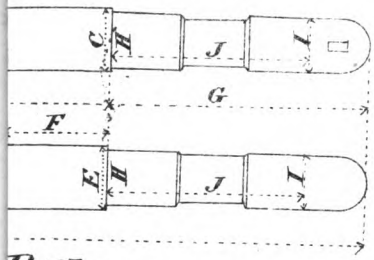
...nd 12 Pdr. Howitzer
...Com.ee Pattern.



...ttern.



...24 Pdr. Howitzer.
...m.ee Pattern.



...Pattern.



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Statement of the Dimensions and Weights of the following Patterns of Axletrees.

	Body.						Arm.					Average weight of Axletree.
	Length from shoulder to shoulder.	Breadth at centre.	Breadth at shoulder.	Depth at centre.	Depth at shoulder.	Length of shoulder.	Length of Arm.	Diameter at shoulder.	Diameter at the end of the Nave.	Length from shoulder to washer.	Total length from arm end to arm end.	
	A Ins.	B Ins.	C Ins.	D Ins.	E Ins.	F Ins.	G Ins.	H Ins.	I Ins.	J Ins.	K Ins.	lbs.
Double Cheek old Pattern	44	3·	3·	2·25	3·	6	15·5	2·75	2·25	12·25	75	140
Block Trail old Pattern	44	3·	3·	1·5	3·	3·5	12·75	2·75	2·375	10	69·5	134
24 Pdr. Heavy Howitzer, Madras Pattern	44	3·5	3·5	2·25	3·5	5·75	13·5	3·5	3·125	9·75	71	167
Medium 5½ Inch Howitzer ,, reduced	44	3·25	3·25	2·125	3·25	5·75	11	3	2·625	7	66	115
6 Pdr. Gun and 12 Pdr. Howitzer, Col. Cullen's Pattern	44	3·	3·	2·	3·	5·5	13	2·75	2·25	9·75	70	117
9 Pdr. Gun and 24 Pdr. Howitzer ,, Pattern	44	3·25	3·25	2·125	3·25	5·5	13	3	2·375	9·75	70	134
6 and 9 Pdr. Guns and 12 and 24 Pdr. Howitzers, Special Board pattern.	44	5	3·5	2·2	3·5	5·2	13	3	2·613	10·05	70	186
6 and 9 Pdr. Guns and 12 and 24 Pdr. Howitzers, G. O. G. 1842 pattern.	48	5	3·25	1·63	3·5	3·5	16·75	3	2·46	13	81·5	157
6 and 9 Pdr. Guns and 12 and 24 Pdr. Howitzers, A. S. C. pattern.	44	4	3·375	2	3·375	5·5	13	3	2·625	10	70	161
6 and 9 Pdr. Guns and 12 and 24 Pdr. Howitzers, Major Anstruther's Iron cheek pattern.	34	3	3	3	3	0	13	3	2·625	10	60	140
6 Pdr. Gun and 12 Pdr. Howitzer, Colonel Cullen's pattern, Arms assimilated to the A. S. C. pattern.	44	3	3	2	3	5·5	13	3	2·625	9·75	70	122
9 Pdr. Gun and 24 Pdr. Howitzer, Colonel Cullen's pattern, Arms assimilated to the A. S. C. pattern.	44	3·25	3·25	2·125	3·25	5·5	13	3	2·625	9·75	70	132

Gun Carriage Manufactory,
Madras, 24*th December*, 1850.

(Signed) J. Maitland, Captain,
Superintendent Gun Carriage Manufactory.

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ARTICLE 602.

On Twelve Light Field Ordnance Carriage Wheels received from Bellary.

On twelve wheels of certain Ordnance Carriages reported to have shrunk so much as to be $\frac{1}{8}$ of an inch less than the breadth of the tire, and considerably warped from their proper position; the wood of which they are constructed, supposed to be Peemah, having been reported by the Deputy Commissary of Ordnance Bellary, as unsuited for Gun Carriage purposes. Under instructions from the Military Board, these wheels are laid before the Committee for their opinion and full report.

The following Documents are laid before the Committee.

(a) No. 5575, 20th Sept. 1850. 1. *Letter from the Military Board to the Superintendent Gun Carriage Manufactory.* (a)

(b) 5098, 11th Sept. 1850. 2. *Letter from the Military Board, to the Officer Commanding Ceded Districts.* (b)

(c) No. 320, 14th January 1851. 3. *Letter from the Military Board to the Commandant of Artillery.* (c)

(d) Fort St. George, 10th Jan. 1851. 4. *Survey Report of Ordnance Carriage wheels received from Bellary.* (d)

Opinion.—On examining the wheels, the Committee find them to be of Saul wood and not of Peemah, and in the state represented in the Survey Report laid before them, bearing the signature of the Principal Commissary of Ordnance.

2. It is quite impracticable for the Committee to submit a full report upon these wheels without further information being given to them. They have the usual appearance of wheels requiring to be drawn up and retired; but, whether this will be sufficient to render them perfectly serviceable, or not, cannot be certified, unless the Committee are put in possession of the following information.

1st. How long the wheels have been constructed, and what treatment they have undergone since they left the Gun Carrage Yard.

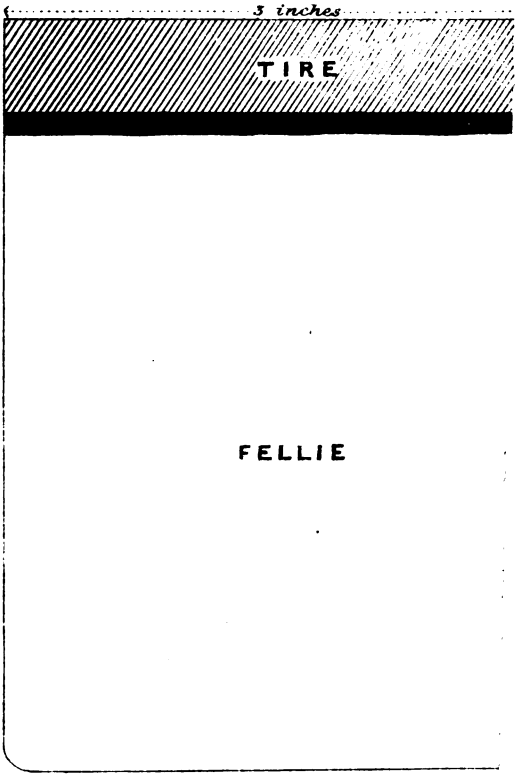
2d. What seasoning they underwent before being made up.

3. In the absence of this information the Committee are inclined to recommend that the wheels be drawn up and retired and then sent to the Artillery Depôt, to be again reported upon in about June or July next.

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Artillery Select Comm.
Meeting 167. Article 60.

Section of the Tire and Fellie of a L
Wheel received from Bellary.



The black line shews the shrinkage between the
The shrinkage in the Wheel from which this wa
ed upwards of 20 inches. — The length of the open
12 to 24 inches. — There is no opening wider tha
shewn.

Artillery Depôt.

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No. 4.

Survey Report on the following Ordnance Carriage Wheels, received from the Arsenal at Bellary as per Military Board's Letter, No. 5098, *dated* 11*th September*, 1850.

Progressive No.	Description.	Carriage Numbers.	Marks.	Condition.	Remarks.
1	Right Wheel Waggon Howitzer 24 Pdr.	10	J. M. 1848	2 Felloes cracked and warped, 1 spoke loose, 2 spokes chafed during the transit from Bellary.	The whole of the Felloes of these wheels have shrunk and warped considerably.
2	Left ,, ,, ,, 24 ,,	,,	,,	2 Felloes cracked and warped.	
3	Right Wheel Waggon limber ,, 24 ,,	,,	,,	1 Felloe cracked and warped.	
4	Left ,, ,, ,, ,, 24 ,,	,,	,,	Requires to be drawn up and retired.	
5	Right ,, ,, ,, Gun 9 ,,	6	,,	1 spoke cracked in several places, 2 spokes chafed during the transit from Bellary.	
6	Left ,, ,, ,, ,, 9 ,,	,,	,,	2 Felloes cracked and warped, and one spoke loose.	
7	Right Wheel Waggon ,, 9 ,,	,,	,,	2 Felloes cracked and warped and one spoke loose.	
8	Left ,, ,, ,, 9 ,,	,,	,,	1 Felloe cracked, and warped 2 spokes chafed during the transit from Bellary.	
9	Right wheel Waggon limber ,, 9 ,,	5	,,	1 Felloe cracked and warped throughout, 1 spoke chafed during the transit from Bellary.	
10	Left ,, ,, ,, 9 ,,	,,	,,	1 Felloe cracked and warped.	
11	Right Wheel Waggon ,, 9 ,,	,,	,,	1 Felloe cracked and warped.	
12	Left ,, ,, ,, 9 ,,	,,	,,	1 Felloe cracked and warped.	

Arsenal,
Fort Saint George,
10*th January*, 1851.

(Signed) F. Blundell, Lieut. Colonel,
Principal Commissary of Ordnance.

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Extract from Letter No. 1078, *from the Sec. Mil. Board, to the Brigadier Commandant of Artillery,* 18*th February,* 1851.

I am directed by the Military Board to request you will be good enough to favor them with a drawing* in full dimensions of a section of tire and felloe and to forward the wheels to the Superintendent Gun Carriage Manufactory who will be instructed to report on them before retiring them, and thereby afford the information required by the Select Committee.

ARTICLE 603.

Experimental Carriage for all Light Field Ordnance, proposed by Major P. Anstruther, C. B.

On an experimental Carriage for all Light Field Ordnance proposed by Captain Brevet Major P. Anstruther, C. B., which was reported on by the Select Committee (a) and ordered by the Military Board (b) to be fitted with cheeks for the 24 Pdr. Howitzer and 9 Pdr. Gun with a view to allow the Select Committee to decide on this useful Carriage.

(a) Meeting 162, Article 582.†

(b) No. 5479, 24th Sept. 1850.

The following Document is laid before the Committee.

Letter No. 23, *from the Superintendent Gun Carriage Manufactory, Madras, to the Secretary Military Board, dated* 9*th January,* 1851.

I have the honor to report the completion of Major Anstruther's pattern Iron Cheek Carriage for all Light Field Calibres ordered in your letter No. 5479, of 24th September, 1850, to be fitted up with iron cheeks for a 24 Pdr. Howitzer and 9 Pdr. Gun, and to request the Board will have the goodness, to cause cattle to be sent to the Manufactory for its conveyance to the Mount for proof.

The present weight of the carriage with

		cwt.	qrs.	lbs.	cwt.	qrs.	lbs.
6 Pdr. cheeks is,	Body,	5	0	26	10	0	16
	2 wheels,	4	3	18			
9 Pdr. cheeks is,	Body,	5	1	26	10	1	16
	2 wheels,	4	3	18			
12 Pdr. „ „	Body,	5	2	0	10	1	18
	2 wheels,	4	3	18			
24 Pdr. „ „	Body,	5	2	19	10	2	9
	2 wheels,	4	3	18			

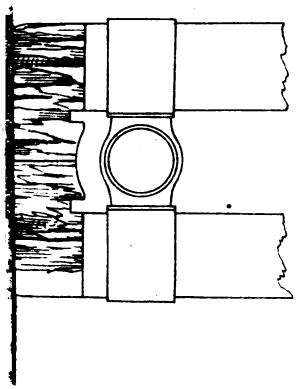
* Plate 31. † Page 93.

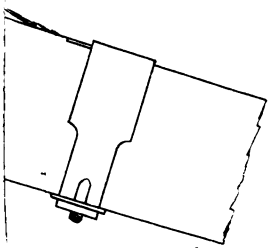
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tee

Instruther's Experimental Proof on the 21st January 1851.

in.





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C.B.

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When the carriage was first weighed with 6 Pdr. cheeks in January 1850, it weighed.

	cwts.	qrs.	lbs.	cwts.	qrs.	lbs.
Body,	5	1	15	10	1	15
2 wheels,	1	0	10			

and with 12 Pdr. Howitzer cheeks in July 1850 it weighed

	cwts.	qrs.	lbs.	cwts.	qrs.	lbs.
Body,	5	1	15	10	1	15
2 wheels,	1	0	10			

(c) 24th Jan 1851. The Proof report (c) of the Carriage with a 24 Pdr. Howitzer is laid before the Committee which shows the Carriage to have broken down, as illustrated in the annexed drawing. (Plate 32.)

Opinion.—In examining the principle of construction of the former Carriage which was built of this pattern by Captain Brevet Major Anstruther, C. B., and which stood Proof, the Committee observed, that the bolts which perforated the beam, were more separated than in the Carriage under report; the alteration in the placing of its bolts so near to each other, has undoubtedly caused this failure in Proof.

2. The feasibility of Major Anstruther's plan, however, of adapting a carriage of this description to different calibres, has in the opinion of the Committee, been satisfactorily shown by the former Carriage having stood all proofs.

3. The Committee consider, the advantage of having one Carriage to answer for different calibres, of such importance, that they recommend the experiment being continued, and that the construction of two carriages by Major Anstruther, in communication with the Superintendent Gun Carriage Manufactory, be ordered; one to be used with a 12 Pdr. Howitzer and a 6 Pdr. Gun, and the other with a 24 Pdr. Howitzer and a 9 Pdr. Gun. The Iron cheeks which have already been made, will be brought into use, the expense, therefore, of this experiment cannot be very considerable, and will be more than compensated by the success which the Committee are of opinion will attend it.

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Report of a Proof of the undermentioned Experimental Carriage for all Light Field Ordnance by order of Colonel G. Conran, Brigadier Commandant of Artillery.

Description.	No. of Carriages.	No. of Firings.	Nature and strength of Powder.	Marks on the Carriage.	Marks on the Ordnance.	Weight of Metal. cwts.	Metal. qrs.	Metal. lbs.	Carriage. cwts.	Carriage. qrs.	Carriage. lbs.	Charge. lbs.	Charge. ozs.	Shot or Shell. lbs.	Elevation. D.	Elevation. M.	Recoil. ft.	Recoil. ins.	Time in Firing.	REMARKS.
Experimental Carriage for all Light Field Ordnance proposed by Captain (Bt. Major) Anstruther, C. B., Reported on by the Artillery Select Committee in Meeting 162, Article 582, and ordered by the Military Board in letter No. 5479, 24th September 1850, to be fitted with cheeks for 24 Pdr. Howitzer and 9 9 Pdr. Gun.	1	2	Madras, April 1849. C. P. Fit, Pressed and Glazed—P. A. Supt. 8 inch Iron Mortar 1 lb. Proof range 650 yards.	J. M. 1849. No. 1	No. 69. A. Wilson, 1841, Cossipore.	9	3	22	10	2	9	2	0	16	P.	B.	11	0	Five Minutes.	At the 2d round the beam of the Carriage broke short off in front, where it is attached to the cheeks by three iron bolts passing through it. The fracture extended from the lower part of the front of the beam to the first iron plate on which the cradle of the elevating screw rests. The bolts were bent, one is broken, the beam fell to the ground, and the metal with the cheeks, recoiled on the wheels 17 feet 9 inches, without displacing the trail end.

ARTILLERY DEPOT,
St. Thomas' Mount,
24*th January*, 1851.

(Signed) G. CONRAN, Brigadier,
Commandant of Artillery.

(Signed) A. F. OAKES, Captain,
Director Artillery Depôt.

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ARTICLE 604.

On the Pattern of Carts for Light Field Batteries.

The following patterns are submitted for the inspection and report of the Select Committee.

Colonel Conran's pattern received December 1850.

1st. Pattern received from the Supt. Gun Carriage Manufactory on the 26th September 1850.

2nd. Pattern received from the Supt. Gun Carriage Manufactory on the 20th January 1851.

The following Abstract of former Proceedings and of a correspondence on the subject of Carts is laid before the Committee by the Director Artillery Depôt.

In December[a] 1849 the Select Committee recommended that,

(a) Meeting 158, Article 546.

1st. All Store, Artificer, and Forge Waggons should be abolished and Carts substituted.

2nd. The Store and Quarter Master's Carts to have a paulin, and the Artificer's Cart a tilt.

In February[b] 1850, the Committee recommended a method of packing the several Carts with the allotment of Stores and half wroughts laid down in Regimental Ordnance Regulations, pages 62,63 and 65.

(b) Meeting 159, Article 549.

In May 1850,[c] it was decided, in consequence of the Artificer's Cart with tilt having been found most cumbersome during the march of a Troop of Horse Artillery from Kamptee to Bangalore, that all the Carts attached to Light Field Batteries of the Bengal pattern were unnecessarily heavy, and certain reductions were suggested in their component parts; the two Carts of Captain Maitland's pattern now before the Committee were constructed accordingly.

(c) Meeting 160, Article 568.

The allotment of Stores for a Battery of Horse Artillery as laid down in the Regimental Ordnance Regulations, pages 62, 63, and 65 are shown in the annexed Statement (marked A) and the weight amounts to 2031 lbs. Of this Colonel Con-

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ran proposes to carry in his Cart the articles noted in the List (marked B) consisting of what would be immediately required for slight repairs to the Carriages, &c. of a Battery as well as to the saddlery and harness amounting in weight to 640 lbs.

In the list (marked C) will be seen that portion of the allotment of a Battery which has been omitted in Colonel Conran's List, consisting of Stores, &c., weighing 1,391 lbs. Colonel Conran proposes carrying the latter in two Carts; Brigadier Montgomerie suggested the latter being carried on Camels, or on Bullocks, according to the nature of the Country and the means disposable.

Each Cart to carry, - - -	700 lbs.
Each Camel, - - - - -	320 ,,
Each Bullock, - - - - -	123 ,,

The Documents on record on this subject are the following:—

1. *Minute*[a] *by Brigadier Montgomerie, C. B., Commandant of Artillery, recommending the construction of Colonel Conran's Cart.*

(a) No. 527, 9th Aug. 1850.

2. *Letter*[b] *from the Military Board, to the Brigadier Commandant of Artillery, giving sanction for its construction.*

(b) No. 4358, 16th Aug. 1850.

3. *Letter*[c] *from do. to do. orders that the Cart shall be submitted to the Select Committee.*

(c) No. 6597, 28th Nov. 1850.

The weight of Colonel Conran's Cart without wheels is

	With Pole.
Body, - - - - -	4 0 11
Pole, - - - - -	0 1 25
	Cwt. 4 2 8

When loaded as proposed by Colonel Conran, the weight required to raise the pole off a prop 41 Inches high is - - 37 lbs.

The peculiarities in the 1st pattern Cart, received from the Gun Carriage Manufactory in September 1850, are,

1st. The Component parts of the Box and Frame are much reduced.

2d. The Splinter bar and braces removed.

3d. The Axletree is of the Light Field pattern.

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4th. The Wheels are of 5 feet diameter with wooden naves and of light construction.

5th. The Weight is

Body, - - - - - -	Cwt.	4	1 20
Wheels, - - - - -	„	3	2 8
Total...		8	0 0

No. 2 pattern received in January 1851, is similar in the Box and Frame to the 1st Cart, the differences in other respects are,

1st. The wheels are of light construction with wooden naves, and 4 feet 8 inches in diameter.

2nd. The Axletree is of the same pattern as the platform Cart.

3rd. The Weight is

Body, - - - - - -	Cwt.	4	0 21
Wheels, - - - - -	„	2	2 23
Total...		6	3 16

Opinion.—The Committee approve of Colonel Conran's separate Box for the Artificer's Tools but would prefer its being placed behind instead of in front of the Cart; and that it should open from rear to front, instead of from front to rear; they are inclined to prefer the construction of the frame work of the Gun Carriage Superintendent's 2d pattern of Cart, received in January 1851, to Colonel Conran's pattern, the former being lighter and, in their opinion, sufficiently strong for the purpose for which it is intended.

2. They would recommend that the Superintendent be directed to complete his Cart with a Splinter Bar and with the upper part according to Colonel Conran's plan, modified as above explained; and that when finished, the Cart be severely tested by the Horse Artillery at the Mount, by being packed with the allotment recommended by Colonel Conran, and moved over every description of bad ground, and after this that the Cart be again submitted to the Committee for final report.

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Statement showing the Allotment and Weight of Artificers' Tools, Materials, &c., for a Battery of Horse Artillery the number and weight proposed to be carried in Colonel Conran's Cart, and the number and weight of those remaining which are proposed to be carried either in Country Carts, or on Camels or Bullocks.

Artificers' Tools, Materials, &c. &c.	A			B			C		
	Total for a Battery of Horse Artillery.			Proposed to be carried in Colonel Conran's Cart.			Proposed to be carried on Country Carts, Camels or Bullocks.		
	No.	Weight. lbs.	Weight. ozs.	No.	Weight. lbs.	Weight. ozs.	No.	Weight. lbs.	Weight. ozs.
Augers of sizes,	4	3	11	4	3	11	0	0	0
Adzes, Iron, Carpenter's,	2	8	8	2	8	8	0	0	0
Anvil, medium,	1	265	0	1	265	0	0	0	0
Axes, Hand,	1	3	5	1	3	5	0	0	0
Awls, Brad,	2	0	3	0	0	0	2	0	3
Bellows, Country, pair,	8	44	0	2	11	0	6	33	0
Braces with bits, Carpenter's,	2	6	12	0	0	0	2	6	12
Chissels, cold,	6	1	8	6	1	8	0	0	0
,, of sizes, Carpenter's,	6	4	2	6	4	2	0	0	0
Compasses, Iron, common,	2	0	8	1	0	4	1	0	4
,, Callipers,	2	0	8	1	0	4	1	0	4
Engraver's for, Iron,	6	0	9	0	0	0	6	0	9
,, Brass,	6	0	4	0	0	0	6	0	4
Files of sorts,	30	10	0	30	10	0	0	0	0
Gimblets of sizes,	4	0	7	0	0	0	4	0	7
Gauges,	4	1	12	0	0	0	4	1	12
Gauges, Carpenter's,	2	0	11	0	0	0	2	0	11
Hammers, Claw,	2	0	14	1	0	7	1	0	7
,, Hand,	2	7	8	2	7	8	0	0	0
,, Rivetting,	2	1	12	2	1	12	0	0	0
,, Sledge,	2	30	0	2	30	0	0	0	0
Irons, Beak,	2	218	0	1	109	0	1	109	0
Lines, Chalk,	1	0	1	0	0	0	1	0	1
Nails, Tools,	2	3	10	2	3	10	0	0	0
Pincers, common,	2	3	9	0	0	0	2	3	9
Carried forward..		617	2		459	15		157	3

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Artificers' Tools, Materials, &c. &c.	A			B			C		
	Total for a Battery of Horse Artillery.			Proposed to be carried in Colonel Conran's Cart.			Proposed to be carried on Country Carts, Camels or Bullocks.		
		Weight.			Weight.			Weight.	
	No.	lbs.	ozs.	No.	lbs.	ozs.	No.	lbs.	ozs.
Brought forward...		617	2		459	15		157	3
Planes, Jack,	2	9	12	1	4	14	1	4	14
„ Smoothing,	1	2	2	0	0	0	1	2	2
„ Trying,	1	6	7	1	6	7	0	0	0
Plates, Screw with Taps, medium,	1	5	8	1	5	8	0	0	0
„ „ „ „ small,	2	3	0	1	1	8	1	1	8
Pots, Glue,	1	2	4	0	0	0	1	2	4
Punche's Steel, Smith's,	4	2	11	4	2	11	0	0	0
Rasps half round, „	4	2	4	2	1	2	2	1	2
Rules 2 feet, Carpenter's,	1	0	3½	0	0	0	1	0	3½
Saws, Hand,	1	1	10	1	1	10	0	0	0
„ Setter,	1	0	4	1	0	4	0	0	0
„ Tenon,	1	2	2	1	2	2	0	0	0
Stamps, Figure,	10	0	15	0	0	0	10	0	15
„ Letter,	26	5	0	0	0	0	26	5	0
Spoke, Shave,	1	0	10½	0	0	0	1	0	10½
Square, Steel Blade,	2	1	5	0	0	0	2	1	5
Stones, Oil,	1	3	8	1	3	8	0	0	0
„ Rag,	1	1	0	1	1	0	0	0	0
Tongs, Smith's,	4	6	0	2	3	0	2	3	0
Turn Screws,	2	0	8	2	0	8	0	0	0
Vices, Bench,	2	17	8	2	17	8	0	0	0
„ Hand,	2	2	14	2	2	14	0	0	0
„ Standing,	1	75	7	0	0	0	1	75	7
HALF-YEARLY SUPPLY.									
Borax, ...Ozs.	0	0	8	0	0	0	0	0	8
Brass, Old, ...lbs.	0	6	0	0	0	0	0	6	0
„ Sheet, ... „	0	4	0	0	0	0	0	4	0
Charcoal, ... Parahs	2	98	0	0	54	0	0	44	0
Chalk, ...Ozs.	0	0	8	0	0	0	0	0	8
Cloth, Waxed, ...Cubits	15	5	12	0	0	0	15	5	12
„ White, ... „	12	2	5	0	0	0	12	2	5
Emery, ...Ozs.	0	0	12	0	0	0	0	0	12
Carried forward...		887	14		568	7		319	7

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Artificers' Tools, Materials, &c. &c.	A			B			C		
	Total for a Battery of Horse Artillery.			Proposed to be carried in Colonel Conran's Cart.			Proposed to be carried on Conntry Carts, Camels or Bullocks.		
	No.	Weight. lbs.	Weight. ozs.	No.	Weight. lbs.	Weight. ozs.	No.	Weight. lbs.	Weight. ozs.
Brought forward...		887	14		568	7		319	7
Husk, Paddy,.....Parahs	1	34	0	0	21	0	0	13	0
Iron, Old,.....lbs.	0	100	0	0	20	0	0	80	0
Leather, Tannery,.....Hides	1	11	6	0	0	0	1	11	6
Oil, Cocoanut,.....Measures	9	27	12	0	0	0	9	27	12
Sal Ammoniac,.....Ozs.	0	0	8	0	0	0	0	0	8
Solder, Brass,.....lbs.	0	1	0	0	0	0	0	1	0
„ Pewter,..... „	0	2	0	0	0	0	0	2	0
Steel,..... „	0	20	0	0	0	0	0	20	0
Thread, Cotton,..... „	0	0	8	0	0	0	0	0	8
Wax, Bees,.....Ozs	0	0	8	0	0	0	0	0	8
Bags, Gunny,.....No.	4	36	4	0	0	0	4	36	4
HALF WROUGHTS.									
Spokes,.....	24	340	0	0	0	0	24	340	0
Felloes,.....	12	182	0	0	0	0	12	182	0
Poles,.....	2	191	0	0	0	0	2	191	0
Splinter Bars.....	2	64	0	0	0	0	2	64	0
Axletree Beds,.....	2	133	0	0	0	0	2	133	0
		2031	12		609	7		1422	5
In addition to the Leather Tannery, &c., included in the half-yearly supply the following is proposed to be carried in Colonel Conran's Cart.									
Hides, Bullock, 1st sort,.....lbs.	0	9	4	0	9	4	0	0	0
„ „ 2d „ ..... „	0	6	8	0	6	8	0	0	0
Leather, common,..... „	0	10	0	0	10	0	0	0	0
Sheep Skins,..... „	0	3	0	0	3	0	0	0	0
Pokers, Iron..... „	2	2	0	2	2	0	0	0	0
Total..		2062	8		640	3		1422	5

ARTILLERY DEPOT,
Saint Thomas' Mount,
3d *February* 1851.

(Signed) A. F. OAKES, Captain,
Director Artillery Depot.

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ARTICLE 605.

ON THE SUBSTITUTION OF WROUGHT IRON BEDS FOR 5½ BRASS MORTARS.

The Military Board request [a] that the reports of Proof of 4 Iron Beds for Brass 5½ Inch Mortars and one Iron Bed for Brass $4\frac{2}{5}$ inch Mortar may be laid before the Artillery Select Committee for their opinion on the propriety of advising Government to discontinue the old pattern and substitute the new.

(a) No. 129, 7th Jan. 1851.

The following Documents are laid before the Committee.

1. *Statement of the weights of the Component parts of 4 Iron Beds for 5½ Inch Mortars proposed by Captain Maitland.*[b]

(b) 24th Dec. 1850.

2. *Letter from the Military Board to the Commandant of Artillery.* [c]

(c) No. 129, 7th Jan. 1851.

3. *Memorandum from the Director*[d] *Artillery Depôt, to the Commandant of Artillery.*

(d) Dated 27th January 1851.

I beg to offer the following observations for your consideration on that part of Para. 1 of Military Board's letter noted in the margin* which refers to 4 Iron Beds for Brass 5½ Inch Mortars.

*No. 129, 7th January 1851.

Para 1. "I have the honor by order of the Military Board to acknowledge the receipt of the Report of Proof of 4 Iron Beds for Brass 5½ inch Mortar, and am directed to request you will lay a copy of the same before the Select Artillery Committee for their opinions which the Board request may be given in extenso specifying the weight of these Beds in contrast with the wooden beds which they are intended to replace, the expense of making each, the probable durability of each, and the propriety of

2. In Board's letter Para. 1, an opinion on four 5½ Inch beds is called for, the Committee are directed to contrast their "weights with "the wooden beds which they are intended to "replace with the view of guiding the Board in "the recommendation to Government to dis-"continue the old pattern and to substitute "the new."

3. On a perusal of this para. of the Board's letter, one might be led into the error of supposing that the 5½ Inch Iron Beds last proved were the only Iron beds likely to be efficient for service—whereas, they are a modification

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advising Government to discontinue the old pattern and substitute the new."

of the beds submitted by Captain, (Bt. Major) Anstruther, C. B., which were laid before the Committee in their Meeting 161, 26th June, 1850, on which occasion a 5½ Inch Iron bed of Captain Oakes' construction was reported upon by the Select Committee in the following terms:—"Captain Oakes' Carriage has shown "satisfactory results and is suited for general purposes as well "as for transport on mountain Service." The other pattern of which the four now laid before the Committee are modifications, failed in Proof.

On entering upon the consideration of the question of what pattern of bed should be adopted for a 5½ Inch Mortar, if it be laid before the Committee without any reference to Capt. Oakes' 5½ inch bed which has been approved of by the Committee, it would tend to mislead those of our body who are not conversant with former Proceedings.

I therefore submit that the question to be considered by the Committee, should not be

Shall this particular 5½ Inch bed referred to in Board's letter supersede the old pattern of wooden bed, and be substituted for it? but,

1st. Shall Iron Beds be substituted for wooden ones—two different patterns of Iron Beds weighing in round numbers about ⅓ of the old wooden pattern, having stood Proof and appearing to be efficient in every way for service?

2nd. Which of the two patterns, (viz. Captain Oakes' which was approved of by the Committee in their Meeting 161 of 26th June, 1850, or that which is now to be reported upon) is preferable for general service?

3rd. If it be considered advisable to have two patterns, for what particular service shall the one or the other be set aside?

4th. If only one pattern is to be adopted which of the two is preferable?

OPINION.—The Committee would wish to defer reporting upon these patterns of 5½ inch Wrought Iron beds, submitted to them until their final report upon the Mountain Train Car-

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riages, &c. among which is a 5½ inch Wrought Iron Carriage upon which they have already reported favorably.

2. With regard to the question as to whether wood, iron, or brass, shall be used for mortar beds, they unhesitatingly recommend that wrought iron beds be used for all mortars of a lower calibre than 8 inch, and that the wooden ones be considered as superseded.

Memorandum contrasting the weights of the Wrought Iron, and Brass 5½ Inch Mortar Beds of Major Anstruther's pattern, and the Wrought Iron bed for the same piece of Captain Oakes' pattern.

	Cwts.	qrs.	lbs.
Major Anstruther's Iron 5½ Inch Bed,	1	1	17
„ „ Brass „ „ „	1	3	8
Captain Oakes' 5½ Inch Carriage as a bed,	1	0	24

To be laid before the Artillery Select Committee at their next Meeting.

(By order.)

(Signed) A. F. Oakes, Captain,
Director Artillery Depôt.

ARTICLE 606.

On the present method of Carrying the Locking Chain with Light Field Carriages.

A Select Committee Carriage, packed for marching order, is shown to the Committee with the view of obtaining their opinion as to whether the mode of disposing of the Locking Chain can be improved upon.

Opinion.—The Committee are of opinion that the locking chain of light field pieces cannot be better disposed of, in marching order, than according to the present plan.

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ARTICLE 607.

On an 8 Inch Brass Mortar with a Cavity in the upper surface of the Bore.

(a) No. 313, 22d January 1851. From the Military Board to the Principal Commissary of Ordnance.

The Military Board call (a) for the report of the Artillery Select Committee on an 8 Inch Brass Mortar received from Cannanore having a cavity $\frac{1}{16}$ of an inch in depth, in the upper surface of the bore 9¼ inches from the muzzle.

(b) No. 2, 4th January 1851.

The Survey report (b) of the above Mortar by the Principal Commissary of Ordnance is laid before the Committee.

Opinion.—The Committee do not consider that the cavity in the bore of this 8 Inch Brass Mortar can be considered as rendering the piece altogether unserviceable, but as 8 Inch Iron Mortars have been so generally introduced into the Service, they do not deem it expedient that this Mortar should be retained as a serviceable piece of Ordnance.

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Survey Report of an Ordnance Brass Mortar received from the Arsenal at Cannanore as per Military Board's Letter, No. 5241, dated 20th September 1850.

DESCRIPTION.	Distinguishing Marks.	Rate. English.	Rate. Bengal.	When Made.	Founder's Number.	Length. Of the Piece. F.	I.	P.	Length. Trunnions. Right. F.	I.	P.	Length. Trunnions. Left. F.	I.	P.	Breadth between the outer extremities of the Trunnions. F.	I.	P.	Diameter. At the Trunnions from shoulder to shoulder. F.	I.	P.	Diameter. Of Trunnions. Right. I.	P.	Diameter. Of Trunnions. Left. I.	P.	Diameter. Of Bore. Horizontally. I.	P.	Diameter. Of Bore. Vertically. I.	P.	Weight. cwt.	qrs.	lbs.	State. Serviceable.	Repairable.	Unserviceable.	
Brass Mortar 8 Inch.	P	1	—	1794	1	2	1	25	4	40	4	40	1	7	75	0	10	90	4	8	4	8	8	0	8	1	4	2	17	0	0	0	A considerable cavity $\frac{1}{16}$ inch in depth in the upper surface of the bore 9¼ inches from the muzzle, recommended to be sent to the Artillery Depôt for examination by Select Committee.

ARSENAL,
Fort Saint George,
4th January, 1851.

(True copy.)
(Signed) A. H. HOPE,
Asst. Secy. Mily. Board.

(Signed) F. BLUNDELL, Lieut. Col.
Principal Commissary of Ordnance.

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MEETING 168.

EXTRACT FROM THE PROCEEDINGS OF THE PERMANENT ARTILLERY SELECT COMMITTEE, ASSEMBLED BY ORDER OF COLONEL F. F. WHINYATES, BRIGADIER COMMANDANT OF ARTILLERY.

Artillery Depôt, St. Thomas' Mount, 4th April, 1851.

Present.

LIEUT. COL. F. BLUNDELL, C. B., *Principal Commissary of Ordnance.*
LIEUT. COL. G. ALCOCK, *Commanding 2nd Battalion Artillery.*
MAJOR J. BACK, *4th Battalion Artillery.*
CAPTAIN T. LAVIE, *Superintendent Gun Powder Manufactory.*
CAPTAIN J. MAITLAND, *Superintendent Gun Carriage Manufactory.*
CAPTAIN A. F. OAKES, *Director Artillery Depôt.*
CAPTAIN B. W. BLACK, *Assistant Adjutant General of Artillery.*

ARTICLE 608.

ON AN EXPERIMENTAL 12 PDR. HOWITZER CARRIAGE AND LIMBER OF PEDDOWK WOOD.

The following Memorandum from the Director Artillery Depôt is laid before the Committee.

MEMORANDUM.

No. 2162, 31st December 1847, Page 673 Artillery Records.

1. In a letter from the Military Board to the Brigadier Commandant of Artillery, when submitting this Carriage to the Artillery Select Committee in December 1847, it was stated that the Board had "every reason to "hope that the wood of which the Carriage was built would "be found quite equal to either Teak or Saul."

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Meeting 145, Article 476, 1st Feb. 1848, Page 673.

The Committee recorded that "the weight of the Carriage was very objectionable being "in excess of the Special Board 12 Pdr. "Howitzer Pattern of 1838 by Cwt. 1-2-22."

Meeting 148, Article 493, 6th June 1848, Page 728.

2. It was subsequently, at the recommendation of the Committee, reduced in weight and underwent an extraordinary Proof of 90 rounds uninjured; it was issued for use with the Horse Artillery Troop at the Mount for 6 months and exposed to climate during that time; afterwards again proved in the ordinary manner, and sent to Secunderabad for trial with the Troop at that station, for 12 months. It reached Madras from Secunderabad in December 1850, and is now submitted for the inspection of the Committee without any repairs having been made to it.

Meeting 153, Article 519, 20th Jany. 1849, Page 893.

3. The weights of the Carriage at the following periods were:

		Cwts.	qrs.	lbs.
In February	1848, ...	14	0	3
June	1848, ...	13	2	20
January	1849, ...	13	1	12
June	1850, ...	12	3	23
April	1851, ...	12	3	15

The last weighing took place after the receipt of the Carriage at the Artillery Depôt, viz.:"

	Cwts.	qrs.	lbs.
Wheels, ...	4	3	23
Body of Carriage, ...	7	3	20
Total..	12	3	15

OPINION.—The Committee observe that there has been a gradual reduction of the weight of this Peddowk Wood Carriage of 81 lbs. in two years, viz., from June 1848 to June 1850; indicating as they conceive that the wood was not thoroughly seasoned, the Carriage has however sustained no injury whatever during the very severe ordeal which it has

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undergone, proving the wood to be of a tough, strong, and excellent quality, such as may with advantage be used whenever great strength is required; as for instance, for beams, splinter bars, and poles of light field, and for cheeks of heavy field carriages.

2. The only fault of this wood for Light Field Carriages appears to be its great weight, but supposing its specific gravity to be the same as that of Saul, its closeness of grain gives it the superiority, especially for the construction of Carriage wheels.

3. The Committee would call especial attention to one great advantage likely to result from the introduction of this wood for beams of Light Field Carriages, viz., that it will remove all objection to the pattern length of trail of the Bengal G. O. G. 1842 Carriage.

4. It will be in the recollection of the Military Board that the present greater length of trail of the Select Committee Carriage compared with the Bengal pattern was caused by the woods, hitherto used in Madras, not admitting of the deep housing of the axle case given to the tough woods of Bengal; * the under surfaces of the cheeks of the Madras carriage being thus raised higher than those of the Bengal pattern, the same angle at the point of contact of the trail end with the ground could only be preserved by lengthening the trail. This great objection in the Select Committee Carriage may now, by the introduction of the Peddowk wood be altogether removed. The Committtee therefore would recommend that all beam trails made of Peddowk wood be in future constructed, with reference to housing and length of trail, according to the Bengal pattern.

* Letter from Supt. Gun Car. Many. to the Secretary Military Board No. 115, dated 18th February 1851.

MINUTE BY CAPTAIN MAITLAND, SUPERINTENDENT GUN CARRIAGE MANUFACTORY.

1. I dissent from that part of the resolution which states that the 12 Pounder Howitzer Carriage of Peddowk wood was

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constructed of unseasoned timber because it has lost in weight 81 lbs.

2. That the Carriage was constructed of properly seasoned timber is apparent from its present condition, after being exposed to such changes of climate and other severe tests, more particularly the state of the wheels, which have not been retired since they were first made, now nearly 4 years.

3. There are high authorities to show that properly seasoned wood does contain moisture. Wood is said to be seasoned when it has lost one-fifth of its weight since the time of felling and that wood is dry when it has lost one-third of its weight, therefore between seasoning and drying there is still moisture in the wood, of between $\frac{1}{5}$ and $\frac{1}{3}$ of its weight, but the weight that this Carriage has lost is only about $\frac{1}{15}$ in the whole.

4. Tredgold does not define drying to consist in the wood ceasing to lose weight but says as a general rule that it is dry when it has lost $\frac{1}{3}$ of its weight whereas it is known some woods lose nearly half their weight.

GUN CARR. MANY. } (Signed) J. MAITLAND, Captain,
MADRAS, 11*th April*, 1851. } *Supt. Gun Carr. Many.*

I quite concur with Captain Maitland in the opinion expressed in the 1st and 2d para. of this Minute.

(Signed) B. W. BLACK, Captain,
Assistant Adjt. Genl. Artillery.

MINUTE BY CAPTAIN T. LAVIE, SUPERINTENDENT OF THE GUN POWDER MANUFACTORY.

I cannot allow the Minute of the Superintendent of the Gun Carriage Manufactory, dated 11th April 1851, on Article 608, Meeting 168 to pass without observation.

The Minute would lead a non-professional or casual reader to understand on the authority of Tredgold that the loss of 81 lbs. weight in the wood work of the 12 Pounder Howitzer Carriage of Peddowk was no evidence that the wood was not

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thoroughly seasoned when the Carriage was built, and that the views the Select Committee have recorded on the subject are incorrect.

I would use the very arguments put forth by the Superintendent of the Gun Carriage Manufactory on the authority of Tredgold to show that the Select Committee are correct in their views, and that the wood was not *thoroughly* seasoned when the Carriage was built, for all that I understand Tredgold to say is, that wood may be sufficiently seasoned for common purposes, (instancing particularly unframed work where there is no joining required) before it is dry or in other words before it is *thoroughly* seasoned.

Time will show whether Peddowk wood seasoned to the extent of that used in the construction of the 12 Pounder Howitzer Carriage is sufficient or whether it is desirable to wait before making use of Peddowk in the construction of Gun Carriages until the wood is dry or in other words *thoroughly* seasoned, its not having shrunk is not sufficient grounds to pronounce it thoroughly seasoned, some woods shrink less than others in seasoning, and still require an equal or greater length of time to evaporate their watery fluid, and if paint is applied before this latter process is completed, the watery fluid retained and which cannot escape, must produce premature decay though it may be some time showing itself.

It should not be lost sight of, that the Peddowk wood of which this Carriage is constructed was cut from log into half wroughts, a considerable time back, that it is more than two years since the original Carriage was reduced in its dimensions, and it is since that again that it has lost 81 lbs. in weight, notwithstanding all the seasoning it has undergone in the log, in half wroughts and when made into a Carriage.

There is another circumstance connected with the Peddowk wood of which this Carriage is constructed, that should not be passed unnoticed; the Select Committee directed one of the

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garnish plates to be removed with the view to ascertaining the condition of the interior surface of the iron, but all endeavours to draw the screws failed, the plate was however partly wrenched up, when it was discovered that the screws were corroded or rusty throughout, and though the interior surface of the plate had apparently been painted before being attached to the wood, still it was considerably corroded or rusted; showing either that the wood itself may be injurious to iron or that some portion of the watery fluid remained in the wood, its not being thoroughly seasoned, causing the corrosion or rust; a nail was drawn from a Teak wood Carriage constructed I think in 1814 with great ease and was found quite free of corrosion or rust and apparently as sound as when first driven.

From the Minute of the Superintendent of the Gun Carriage Manufactory I understand that the weight of the *wood work* of the Carriage when reduced in dimensions was 972 lbs., it has now become $\frac{1}{12}$ of that weight less or 81 lbs.; I can see no way of accounting for this last loss excepting that the wood has been undergoing further drying or more thorough seasoning, as taken for granted by the Select Committee, and which I consider we have a right to take for granted, unless the Superintendent of the Gun Carriage Manufactory can give any other more satisfactory reason for the loss in weight.

(Signed) T. Lavie, Captain,
Supt. Gun Pow. Manufy.

Powder Mills,
21*st April*, 1851.

I fully agree with Captain Lavie, and trust that Peddowk wood may never be sanctioned for the construction of Gun Carriages, &c.

(Signed) G. Alcock, Lieut. Colonel.

I fully concur with Captain Lavie.

(Signed) A. F. Oakes, Captain.

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ARTICLE 609.

ON THE PERIOD REQUIRED FOR SEASONING TIMBER IN LOG AND HALF WROUGHTS—THE PROPER SCANTLING AND WEIGHTS OF HALF WROUGHTS—AND THE APPLICATION OF THE SEVERAL DESCRIPTIONS OF WOOD FOR THE COMPONENT PARTS OF ORDNANCE CARRIAGES.

The whole of the correspondence during the last quarter of 1850 and the first quarter of 1851, between the Military Board, the Brigadier Commandant of Artillery and the Superintendent of the Gun Carriage Manufactory, connected with the subject of timber—the period of seasoning in log and in half wroughts—their scantling—their weights and application for Ordnance Carriages, as well as the whole of the tabular statements furnished by the Superintendent of the Gun Carriage Manufactory on the same subject, having received the deliberate consideration of the Committee, they submit what in their opinion will be the most effectual course of procedure towards carrying out the instructions of the Military Board conveyed to them in the documents now referred to.

OPINION.—The following Table (A) may be taken as descriptive of the timber now recommended to be used for the various parts of Ordnance Carriages, and when the Committee have been able to ascertain, beyond a doubt, what is the specific gravity of these several woods in their unseasoned and seasoned states, they purpose then entering upon the several questions before them.

2. With the view of arriving at a sound and practical judgment on the important points under consideration, the Committee propose, that specimens of each description of wood of certain dimensions, be blocked out as far as practicable from the same log, care being taken that each log shall previously have undergone two years seasoning; that these pieces be weighed every month, until the wood shall have

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ceased to lose weight for three consecutive months, and that the monthly reports be submitted quarterly to the Committee.

3. The necessity of this measure as a starting point will be apparent when the great diversity of opinions which now exists on the subject of seasoning Indian woods be considered; as an example of which the following Tables (B and C) are appended, containing;

1st. The opinions, grounded upon their own experience, of the several Gun Carriage Agents of the three Presidencies. (Table B.)

2nd. Experiments made by General Cullen formerly Gun Carriage Agent at Madras, relative to the drying of one cubic foot of Teak Timber (Table C.)

4. A third Table (D) of Experiments relative to the loss of weight in seasoning English Oak is also forwarded, to show the authority in support of the testing system now recommended.

5. With the view of carrying out this measure, it will be necessary that the following woods be selected, and that five pieces of the dimensions hereafter described be blocked out on the same day, by the same party, to be dealt with as shown in the foregoing para. 2.

Description of Woods and their Dimensions.

Malabar Teak, - - - -	5 pieces of each kind 3½ feet long, of 3-6-9 and 12 inches square. Total number of pieces, 140 pieces.
Annamallay ,, - - - -	
Pegue ,, - - - - -	
Trincomallee, - - - -	
Peddowk, - - - - - -	
Saul, - - - - - - -	
Peemah, - - - - - -	

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A

Description of Timber to be used for the various parts of Ordnance Carriages, &c.

COMPONENT PARTS.	TIMBER.
Carriage Light Field.	
Beams and Cheeks,	Malabar, or Annamallay Teak.
Axletree Cases,	Malabar, Annamallay, or Pegue Teak.
Ammunition and shot Boxes,	Do. do. do.
Limber.	
Axletree Cases,	Malabar, Annamallay, or Pegue Teak.
Braces,	Malabar, or Annamallay Teak.
Perch, short,	Do. do. do.
Splinter Bars,	Trincomallee, or Peddowk.
Poles,	Trincomallee, Peddowk, or Saul.
Foot Boards,	Malabar, Annamallay, or Pegue Teak.
Pole props,	Trincomallee, Peddowk, or Saul.
Waggons.	
Perches,	Malabar, or Annamallay, Teak.
Framings,	Do. do. do.
Axletree Cases,	Malabar, Annamallay, or Pegue Teak
Foot Boards,	Do. do. do.
Handspikes and Wheel props,	Trincomallee, Peddowk, or Saul.
Carriage Heavy Field.	
Cheeks,	Malabar, or Annamallay Teak, or Peddowk of reduced dimensions.
Transoms,	
Axletree Cases,	Malabar, Annamallay, or Pegue Teak.
Semelle,	Do. do. do.
Store Box,	Do. do. do.
Handspikes,	Peddowk, Trincomallee, or Saul.
Limber Heavy Field.	
Axletree Cases,	Malabar, Annamallay, or Pegue Teak.
Braces,	Malabar, or Annamallay Teak, or Peddowk of reduced dimensions.
Framings,	
Pole and Pole Prop,	Trincomallee, Peddowk, or Saul.
Garrison Carriages and Traversing Platforms,	To be made of Peddowk.
Wheels.	
Spokes, Felloes, Light and Heavy Field.	Malabar, Annamallay, Pegue, or Peddowk of reduced dimensions, & also Felloes of Peemah.
Cart Work,	Do. do. do.
Yokes,	Peddowk.
Gyns,	Teak.

(Signed) J. Maitland, Captain,

3d April, 1851. *Supt. Gun Car. Many.*

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B

The period necessary for seasoning Timber in Log and Half Wrought state.

Authority with the date of opinions.	Description and Scantling of Timber.	In Log.	In Half Wrought.
	BENGAL AUTHORITY.		
Major Abbott, Agent for Gun Carriages, Futtyghur 1844 and 1845.	Saul. 5 Feet girth	2 years.	
	Saul. 6 or 7 „ „	3 „	
	Saul. Of small scantling,		2 **years.**
	Saul. 9 and 6 Pounder Beams,		3 „
	Saul. 12 and 24 Pdr. Howitzer Beams,		4 „
	Saul. Of small scantling,	2 years.	3 „
	Saul. 9 and 6 Pounder Beams,	2 „	4 „
	Saul. 12 and 24 Pdr. Howitzer Beams,	2 „	5 „
	MADRAS AUTHORITIES.		
Lt. Col. Frith, Principal Commy of Ordnance and Supt. Gun Carriage Manufactory.	Teak,	2 years.	2 **years**—4 **years** for joiners work.
Major General Cullen, Resident, Travencore, 1851, and formerly Supt. Gun Carriage Manufactory.	Teak,	4 or 5 years.	6 **weeks**, or 2 **months.**
Capt. Maitland Supt. of Gun Carriage Manufactory 1851.	Teak Malabar,	3 to 4 years.	3 to 6 **months.**
	„ Moulmein,	2 years.	3 to 6 „
	„ Coimbatore or Annamallay,	3 to 4 „	3 to 6 „
	„ Pegue,	3 to 4 „	3 to 6 „
	„ Shimbeam,	2 „	3 to 6 „
	„ Lymbooriah,	2 „	3 to 6 „
	„ Sheathing boards,	2 „	3 to 6 „
	Saul,	5 years.	2 **years** (Beams).
	„	5 „	1 **year** (small pieces.)
	Peddowk,	3 „	2 to 1½ **yrs.** (Beams.)
	„	3 „	1 **year** (small pieces.)
	Peemah Red,	2 „	1 **year** to 6 **months**
	„ White,	Not known.	
	Peengandoo,	5 years.	1 to 2 **years.**
	Ooroopoo,	Not known.	
	Chittagong Red,	2 years.	3 to 6 **months.**
	„ White,	Not known.	
	Sissoo,	3 years.	1 **year** to 6 **months**
	Trincomallee,	2 „	6 **months.**
	Satin,	3 „	6 „
	Mutti,	2 „	6 „

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Table B. *(continued.)*

Authority with the date of opinions.	Description and Scantling of Timber.	In Log.	In Half Wrought.
	BOMBAY AUTHORITY.		
Major Grant, Agent for Gun Carriages, Bombay, 1850.	Teak, 80 inches and upwards in girth,	3 to 5 years.	3 to 5 **years.**
	„ under 68 inches to 56 inches in girth,	2 to 4 „ ..	
	„ largest girth.	3 „ ..	
	Blackwood, „	less than 3 „	
	Baubool,	2 or 3 „ ..	

(Signed) A. F. OAKES, Captain H. A.
Director Artillery Depôt.

C

Experiment relative to the drying of* 1 *Cubic foot of Teak Timber, by General Cullen of the Madras Artillery.

		lbs.	ozs.	drs.
Weighed on	9th February 1810,	55	0	0
	9th January 1811,	43	0	0
	9th July 1811,	38	0	0
	9th January 1812,	36	5	4
	9th July „	35	8	0
	9th January 1813,	35	5	0
	9th July Seasoned 3½ years,	35	0	½
	9th January 1814,	35	1	2
	9th July „	35	2	0
	9th January 1815,	35	0	10
	9th July „	35	1	12
	9th January 1816,	35	3	3
	9th July „	35	2	8
	20th February 1825,	34	13	0
	26th July 1834,	35	2	8
	22d June 1835,	35	2	8

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D

Table of Experiments relative to the loss of weight in seasoning English Oak by Barlow.

	No 1.	No. 2.	No. 3.	No. 4.	No. 5.	No. 6.	No. 7.	No. 8.
	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.
Length,	24 2/4	25 4/8	30 4/8	31 1/2	39 2/4	30 1/4	37 3/8	38 2/4
Breadth,	16 3/8	14 1/2	16 3/8	12 2/8	16 3/8	12 2/8	14 1/8	14 1/2
Depth,	10 5/8	9 2/4	8 1/8	7 1/8	6	5 1/4	4	3
PERIODS OF WEIGHING.								
	lbs.	lbs.	lbs.	lbs.	lbs.	lbs	lbs.	lbs.
February, 1810,	163 1/2	133	164	104 1/2	163 1/2	77 1/4	92	74 1/8
March,	154 1/2	123 1/4	155 1/4	99	148 2/8	71 1/8	82 1/4	65
April,	149 1/2	118	151 1/4	96	142 1/2	68 2/4	78	60 2/4
May,	144 1/2	113 1/2	147	92 2/4	135 2/8	66 1/4	75	56 2/4
June,	140 1/2	109 1/4	143 1/2	90 1/4	130 1/4	64	71 1/4	53 1/4
July,	137 2/4	106 2/4	141	88 1/4	127	62	69 1/2	51 1/8
August,	135 1/4	104 1/2	139 1/4	87	123 2/4	61	67 2/4	50 1/2
September,	133	102 2/4	137 1/4	85 1/4	121	59 2/4	66	49 1/4
October,	131 2/4	101 1/2	136	84 1/2	119 1/2	58 2/4	65	48 1/4
November,	130 1/4	100 1/2	134 2/4	84	117 2/4	58 1/4	64 1/2	47 2/4
December,	129 2/4	99 1/2	131 1/4	83 1/4	117 1/2	58	63 2/4	47 2/4
January, 1811,	129	99	133 1/4	82 2/4	116 2/4	57 1/4	63 1/4	47 1/4
February, (a)	130 1/4	100 1/4	135	84	118	57 2/4	65	47 1/4
March,	127 1/4	98	132	81 2/4	115	57	62 2/4	47
April, (b)	127 2/4	97	132 2/4	83	116	58 1/2	64	46 1/2
May,	125 1/4	96 1/2	130	80 1/4	113 1/4	56 1/4	61 2/4	46 1/2
June,	124 1/4	95 1/4	129 1/4	79 1/2	112 1/4	55 2/4	61	46 1/4
July, (c)	124 1/8	96	129 1/2	80 3/4	112 1/2	55 1/4	62 1/4	46
August,	121 3/8	93 1/4	127	78 1/2	109 2/4	54 1/4	60 1/4	45 1/8
September,	122	92 1/4	127 1/2	79 1/4	109	56	59 1/2	45 3/8
October,	119 2/8	92	125 1/8	77 1/4	108 1/4	54	59 1/2	45 1/8
November,	121	93 2/4	126 1/2	77	110	56	59 1/4	45 2/4
December,	119 2/4	91 1/2	125	77 1/4	108 1/4	54	59 1/4	45 2/4
January, 1812,	119	91 1/4	124 1/2	76 1/8	107 3/4	53 3/4	59	45 1/8
February,	118 2/4	91 1/4	124	76 2/4	107 0	53 1/2	59	45 2/4
March,	118 1/8	91	124	76 2/4	107 2/4	53 1/4	59 1/4	45 2/4
April,	117 1/4	90 2/4	123	76 1/4	106 2/4	53 1/4	58 2/4	45 1/4
May,	117 1/2	90	122 2/4	75 2/4	106 1/2	53	58 1/4	45 1/4
June,	116 2/4	89 1/2	122	75 1/4	106	52 1/4	58	45 1/4
July,	116	89 1/4	121	75 1/4	105 2/4	52 2/4	58 1/4	45
August, 1812,	115 1/4	89	121	74 2/4	105 2/4	52 1/2	58	45 1/4
August, 1813,	111 1/4	85 2/4	116 2/4	72 1/4	103 1/4	51 1/2	57 1/4	45
August, 1814,	108 1/4	85	114 1/4	71 1/2	103	51	57 1/2	45 1/8
August, 1815,	106 3/8	84 1/2	112 1/8	70 1/2	102 2/8	51 1/4	57 1/4	45

(a) Very much rain since last weighed.

(b) Rained several days previous to weighing.

(c) Constant rain for two days previous to weighing.

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MINUTE BY CAPTAIN J. MAITLAND, SUPERINTENDENT GUN CARRIAGE MANUFACTORY.

1. I am sorry to be obliged to differ from my colleagues in the resolution they have come to on this subject. Their reasons for delay in affording the information called for by the Military Board, appear to me untenable, insufficient, and based upon erroneous premises.

2. The temperate climate of Madras differs so greatly from the intense heat of Futtighur, and the humid atmosphere of Bombay, that it is reasonable to expect the diversity of opinion alluded to in Para. 3 of this resolution.

3. The Bengal Agent states the time he allows, and explains his own method of seasoning Saul, but he is silent about other kinds of timber. If Major Abbott's letters on this subject are read carefully, it will be observed, that the long tedious process he recommends, is to meet the peculiarity of the climate of Futtighur, that it is to prevent Saul from seasoning too rapidly in that dry and intensely hot climate, which would (if no artificial means were adopted) cause the timber to crack and split and render it useless, but, such a protracted period or such a process, is not necessary within a mile of the sea, with a sea breeze blowing for the greater part of every day and night throughout the year.

4. It is distinctly stated by the Bombay Agent that since 1840, no regular course of seasoning on fixed and established rules, has been pursued at the Bombay Gun Carriage Manufactory, but, that Timber has been allowed to remain in log four years, and in half wrought 2 or 3 years before being used. This is stating the practice but gives no data for the guidance of the Artillery Select Committee, as it is surely an incontrovertible fact that a beam requires more time to season, than a splinter bar, or a piece of framing.

5. The Bombay Agent does not state what the rules for seasoning timber were prior to 1840, but it appears from

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the 2nd para. of Captain Leslie's Report, dated Camp, near Peshawar, 12th November, 1842, Artillery Records, page 393, Miscellaneous, that his Carriages were built of unseasoned timber, we may fairly conclude, that if the rules were good, they were not always adhered to.

6. If the correctness of the data furnished by me to the Military Board, which has been laid before the Select Committee, is called in question, why do the Committee not point out one or more inaccuracies? It is my object to have this important question decided upon sound practical data, and I confess I would rather rely upon the results of long experience than trust to a few experiments of the Artillery Select Committee however minutely and carefully conducted.

7. I have given the best information I could collect, not merely from my own limited experience of 12 years at the Manufactory, but, from that of my predecessors, and more particularly I would refer to that of General Cullen, who has devoted his whole life to scientific subjects.

8. As to the Committee ever arriving beyond a doubt at the specific gravity of every description of timber in their unseasoned and seasoned states, I believe it to be impossible, for no two authors are agreed on the subject. I will here give the results of the experiments of three Authors in Europe, and two in India, who have attentively studied the nature of Teak timber, to show that nothing more than an approximation can be arrived at in the specific gravity of timber.

		Green. lbs.	Dry. lbs.
Europe.	Chapman,		52
	Barlow,		46·56
	Couch,		41·06
India.	Edie,	57 to 60	$39\frac{2}{8}$ to $52\frac{15}{16}$
	Cullen,	72	45

9. To prove that the specific gravity of any known substance is not always uniform, I give a statement of the speci-

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fic gravities of Platina, Mercury, and Iron from four different authorities, who all disagree in their results.

	Hutton.	Magazine of Science.	Dictionary of Terms of Art.	Dictionary of Mechanical Science.
Platina,	20·722	21·470	21·500	20·340
Mercury,	13·598	13·600	13·500	13·570
Iron,	7·788	7·700	7·700	7·790

If there is the difference, as above stated, in bodies of such densities, how much more may be expected in timber which is of a porous nature. It is moreover an established fact, that not only does the timber of one country and forest differ from that of another country, but that the weights and the strength of the wood in different parts of every tree vary according to their position, and according to the quality of the soil, the exposure when growing, and other circumstances, which it is useless here to enumerate.

10. I have recorded my opinion against the Resolution of the Committee, as I feel that the delay in settling this question is quite unnecessary, and that it will cause inconvenience to the public service.

Gun Carriage Manufactory, Madras, 14*th April*, 1851.

(Signed) J. Maitland, Capt.
Supt. Gun Carr. Manufy.

Minute by Captain B. W. Black.

The Committee has thus decided on postponing the disposal of this subject, but as I anticipate no results from the proposed experiments likely materially to disturb any opinion, we may now come to on the data available at the Gun Carriage Manufactory and elsewhere, I believe the consideration of it may with advantage be entered upon at once.

St. Thomas' Mount, 14*th April*, 1851.

(Signed) B. W. Black, Captain,
Assist. Adjt. Genl. of Arty.

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MINUTE OF CAPTAIN A. F. OAKES,
Director Artillery Depôt.

19*th April*, 1851.

The Superintendent of the Gun Carriage Manufactory in Para. 1 of his Minute, dated 14th Instant, has recorded that our reasons for delay in affording the information called for by the Board "are untenable, insufficient, and based upon erroneous premises," and in para. 10, that "the delay in settling the question is quite unnecessary, and that it will cause inconvenience to the public Service," and yet a reference to the Military Board's instructions will show our resolution to be strictly conformable to their express recommendation.

1*st Extract in letter from Military Board, No.* 1362, *of* 22*d February*, 1851.

Para. 7. "With the varieties of woods now in the yard, the Board do not see any difficulty in your cutting out one half wrought for each kind, immediately weighing them and registering the weights monthly for a period of 2 years, by which time you will, probably find that the diminution of weight in each Teak half wrought is about one-third of the original weight varying perhaps with the woods used."

2d *Extract in letter from Military Board, No* 961, *of* 11*th February*, 1851.

Para. 4. "The only point to be further noticed is the period of seasoning the timber in log and in a half wrought state, and as the Board consider that the Superintendent has either from his own experience or from the Records of the other Presidencies, sufficient reason for recommending the time specified in his Statement, an opportunity will be given him of laying his information before the Select Committee to enable that body to approve of the period suggested."

Para. 5. "The Committee will observe that the period practised in Bengal and Bombay for seasoning timber is un-

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" usually protracted as compared with the periods recommend-
" ed at Madras, and it will therefore be requisite for the
" Madras Select Committee carefully to weigh the grounds on
" which they base the system they may recommend to be es-
" tablished at this Presidency."

3d *Extract in a letter from Military Board, No.* 1362, *of 22d February*, 1851.

Para. 6. " Without desiring to adhere exactly to one
" weight, the Board require a maximum weight of half
" wroughts so as to enable the Artillery Officer to know posi-
" tively the outside weight to be carried on Carriages."

2. I now propose to examine the arguments advanced by Captain Maitland, it will be for superior authority to decide, whether in adopting the precautionary measures suggested for our consideration by the Military Authorities under whom our Committee is convened, our course has been judicious or deserving to be stigmatized as " untenable, insufficient, and based upon erroneous premises," " quite unnecessary," and " causing inconvenience to the public service."

3. With reference to Paras. 2 and 3. The Superintendent's remarks on the favorable effect of the *temperate climate of Madras in shortening the seasoning process, and of the advantages to be derived from the sea breeze.* With regard to this point let " Tredgold" reply, in page 199.—" *Common salt in small quantities assists the decomposition of vegetable matter ;*" now it cannot be disputed that impregnated with salt as the sea breeze is, some portion of it is taken up by absorption into the pores of the wood ; and this, from its strong attraction for atmospheric moisture, must undoubtedly tend rather to retard, than to expedite the process of seasoning ; and I think I may venture to assert, that there is not a single authority to be found, showing that the sea coast offers advantages in the seasoning of timber, but on the contrary it may with reason be concluded that dry inland sites are far preferable ; and there can be no ground for doubt that the

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climate of Futtighur is on the whole with due precautions (admirably pointed out by the Bengal Agent) better for seasoning timber than that of Madras, where the Southerly breezes are peculiarly unfavorable. I will here take the opportunity of inviting attention to the terms "*drying*" and "*seasoning*" as applied by different authors: "Tredgold" in page 188, under "*Laws of seasoning*," writes:—"The time "required to season or to dry a piece of timber obviously "depends upon its magnitude, &c." he appears afterwards to use the term seasoning to give a more definite meaning to the progressive stages in drying; what "Tredgold" calls "dried" is identical with "seasoned" according to "Barlow:" "Tredgold," says in page 188, "I consider timber dry when it "has lost one-third of its weight." "Barlow," says in page 12. "More than ⅓ of the weight is lost in seasoning." We may therefore fairly consider the terms "dried" of "Tredgold," and "seasoned" of "Barlow" as synonimous.

The following Table will be found in Tredgold, page 189.

*Time of "***Drying***" according to "***Tredgold***."*
(*Time of "***Seasoning***" according to "***Barlow***."*)

Timber	Length 10 feet Breadth 6 inches Thickness 6 „	2 years 5 months.
Timber	Length 10 feet Breadth 8 inches Thickness 8 „	3 years 3 months.

4. With reference to Paras. 4 and 5, I do not clearly perceive how the Superintendent's allusion to the Bombay Agent's rule for seasoning, bears in any way on the question at issue; nor do I see how it can be charged against the Bombay Agent that "he gives no data for the guidance of the Artillery Se-"lect Committee"—on the contrary, it appears to me, that his data are excellent, for he gives "four years for log" and "two or three years for half wrought seasoning" which periods appear generally to fall in with the first authorities both in England and in India, and the Superintendent himself attributes

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the failures in Carriages at Peshawar in 1842, to the neglect of these rules, and to their having worked up unseasoned timber!

5. With reference to Paras. 6 and 7. The data furnished by the Superintendent, and to which he appears to lay so much stress consisted of.

1st. Table, dated 29th August: 2nd and 3rd, dated 21st September, 1850, containing dimensions, cubical contents and the weights of each of the half wroughts ordered to be carried with a Light Field Battery, also of certain woods in Store at the Manufactory.

4th. Table, dated 6th February, 1851, contains, the Superintendent's opinion as to seasoning in log and in half wrought of certain descriptions of timber therein specified with the characteristic appearance of each, their specific gravity, and for what purposes each description of wood is best suited.

5th. Table, dated 6th February, 1851, contains the Superintendent's opinion as to the timbers best suited for the different parts of Ordnance Carriages.

6th, 7th, and 8th Tables, dated 17th February, 1851—contain the names of the component parts of half wroughts of certain descriptions of timber, the dimensions of rough and finished half wroughts, cubical contents, weight, logs when received, &c., with the three following columns of Tables 7th and 8th filled in, thus:—

1. What diminution in weight may be expected from longer seasoning. 2. Weight when perfectly seasoned. 3. Finished weight when perfectly seasoned.	Impossible to say as each description of wood differs in every log.

9th. Table, dated 17th February, 1851, giving a comparative statement of the component parts of wood work for the Madras and Bengal Patterns of Light Field Carriages, &c., together with drawings.

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6. Had the present Superintendent submitted to the Committee satisfactory statements of experimental tests made by himself in proof of his assertion, that 6 weeks or two months were sufficient for seasoning half wroughts; or, had the experience of late years in the construction of Gun Carriages shown an improvement, as regards durability, over the old system, there might have been some ground for considering that the Committee had "unnecessarily delayed" to forward the information called for, but neither the one nor the other has been shown. All the Superintendent's arguments in favor of seasoning half wroughts in six weeks and two months, seem to be comprised in his own experience, supported by the opinion of General Cullen, who held the same appointment previous to 1830, and *who writes from recollection of the practice which then obtained at the Manufactory.*

7. If the established system previous to 1830 had been to season half wroughts for two months only, is it likely that an Officer of such notoriously scientific and practical knowledge and experience as the late Colonel Frith of the Madras Artillery who succeeded General Cullen in the appointment of Superintendent, would without good reason, have seasoned half wroughts for two years instead of two months? No no—any one who knew Colonel Frith would confidently say, that he would not have introduced such a radical change on insufficient grounds.

8. With regard to Gun Carriages which have been constructed of late years, the following Memorandum shows, that a great number of different descriptions have from time to time been repaired, and some become unserviceable, long before the ordinary time of lasting, and caused in most cases, it would seem, according to the opinions of our Officers, from the wood *not having been properly seasoned.* The examples I have given refer to the occurrences of the last two years.

9. Although it was the earnest desire of the Committee to give the fullest weight to the Superintendent's assertions, they certainly did not feel justified in receiving them to the exclu-

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sion of the high Authorities both in England and in India, all laying down almost diametrically opposite views to those entertained by him. The authorities I allude to are "Tredgold," "Barlow," and in India the late "Colonel Frith," "Major Abbott," and the Bombay Agent. The sole object of the Committee in prosecuting this inquiry is to arrive at those "sound practical data" alluded to, and they are prepared to follow the results of the inquiries of the scientific men who have written on this subject in England, corroborated as it practically is by that able and experienced Officer before quoted, the late Colonel Frith; surely the information laid before the Committee by the Superintendent can scarcely be called data? As to the correctness or otherwise of his tables upon which the Superintendent seems to attach so much importance by challenging the Committee to discover inaccuracies, I cannot see what these Tables have to do with the question: their contents, I have already detailed in paragraph 5, and it must be obvious, that they could afford no assistance whatever to the Committee, when determining *the proper course of the seasoning of wood for Gun Carriage purposes*; a subject vitally affecting the efficiency, nay, the honor of our Regiment. Holding this opinion, as I do in common, I believe with the majority of the Members of the Select Committee, I repudiate the imputation conveyed by the Superintendent, namely, that "the Committee are disregarding long expe-
"rience and scientific opinion and trusting to a few experi-
"ments."

10. With reference to Para. 7, the Superintendent here enters on the subject of specific gravities, with the view apparently of showing, that they are not all of one result, and therefore useless. Now with regard to the general question, it is undeniable that many bodies have differing specific gravities assigned to them by different authorities, but specific gravities have two distinct offices, the one for scientific investigation, in which perfect accuracy is all important, the other in the application of specific gravities

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to Civil Engineering and other *practical* purposes, and for this latter purpose *any* of the specific gravities quoted, would be sufficiently accurate. "Barlow" in his remarks on seasoning, page 13, speaks of the specific gravity of "Oak" as always within certain limits before and after seasoning, he does not mean that every piece of Oak weighs 1074 before seasoning, and 720 after that process; but that using Oak in the generic sense, these are the mean weights, and that they are near enough to accuracy to afford "sound data" for practical purposes, and so it is with our specific gravities of Teak, &c.; it is perfectly well known to every one, that not only do trees of the same kind vary, but parts of the same tree vary, and yet with all this, a mean specific gravity gives a result adapted for practical application.

11. In conclusion I would observe that we cannot, in my opinion, take too many precautions, in considering the question of seasoning necessary for wood intended for Gun Carriages; especially, when it is considered that unseasoned wood painted over will necessarily become prematurely unserviceable from the confined moisture in the wood, causing the fibres to rot; how can we otherwise account for the bad wood which we have occasionally met with in Gun Carriages?

ARTILLERY DEPÔT,
19*th April*, 1851.

(Signed) A. F. OAKES, Capt.
Director Artillery Depôt.

I entirely concur in Captain Oakes' Minute.

(Signed) F. BLUNDELL, Lieut. Col.

It was my intention to have prepared a Minute in reply to that of the Superintendent of the Gun Carriage Manufactory, dated 14th April, but concurring entirely in the views taken by the Director of the Artillery Depôt in the above Minute just received, I will not increase the bulk of the records by recording my sentiments separately.

POWDER MILLS,
21*st April*, 1851.

(Signed) T. LAVIE, Captain,
Supt. Gun Powder Manufy

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I concur in Captain Lavie's observations, and refrain from recording another Minute.

(Signed) G. Alcock, Lieut. Col.

Memorandum exhibiting the several Official Reports of Officers of the Regiment on the subject of the Unseasoned Wood of which the Gun Carriages, &c., have been constructed during the last two years.

1st Report. On 12 Gun Carriages and Ammunition Waggons made of Saul and Teak wood of the Select Committee pattern issued to the A Troop Horse Artillery in May 1849, and specially reported on by Brigadier Montgomerie on the 14th December, 1849, who concludes his Report as follows :

1st Extract. "The defects must be therefore attributed "to the timber not having been properly "seasoned before being made up. The defects in the other "carriages must be attributed to the same cause, although "not in so great a degree as in the two first."

(Signed) P. Montgomerie, Brigadier,
Commandant of Artillery.

2d Report. On the same 12 Carriages again reported upon in August, 1850.

2d Extract. "On a minute examination, the whole of "the wood work appears to have slightly "shrunk, and the fellies a little opened, but not by any means "to such an extent as to require being sent into store for re-"pair. Three of the carriages are made of Saul and three "of Moulmein Teak, and one description of wood appears to "have suffered as much as the other from the effects of the "late hot season."

(Signed) P. J. Begbie, Major,
Acting Director Artillery Depôt.

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3d Extract. "I coincide in the observations made by "the Acting Director, but I consider the re- "marks I made in Report No. 575, dated 14th December, "1849, of the timber having been insufficiently seasoned as "still evident."

(Signed) P. MONTGOMERIE, Brigadier,
Commandant of Artillery.

3d Report. On the Light Field Carriages in the Field Train of the Artillery Depôt, dated 31st August, 1850, by Major Begbie Acting Director Artillery Depôt, the result of which was, that 32 carriages of different descriptions which had been constructed during the years 1848 and 1849, had shrunk to a degree to call for the following recommendation from Brigadier P. Montgomerie, C. B., Commandant of Artillery.

4th Extract. "The whole of the carriages, (viz. 32 in "number) to be sent immediately to the Gun "Carriage Manufactory to be put in a serviceable state."

4th Report. On 12 Gun Carriages and Ammunition Waggons issued to the D Troop Horse Artillery of the Select Committee Pattern in October, 1849.

5th Extract.

Extract from a letter from Captain J. E. Mawdsley, Commanding Artillery N. S. Force, to the Director Artillery Depôt, dated 29th December 1850.

"At the time the Committee assembled, the wood had "shrunk to such an extent that the whole of the iron fasten- "ings required refitting, the bolts of every description requir- "ed screwing up, particularly the transom bolts, the cheeks "of the Carriages having opened considerably; whether it "would have been necessary to take these to pieces to remove "particles of dirt, &c. which had worked itself in, I cannot "say, but such parts of the iron work as the garnish plates, "axletree bands, draught loops, stay irons, &c., would of "course have to be taken off as they could not be refitted

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" without being cut or "jumped up;" the whole of the wheels " required re-tiring and the nave plates screwing up, the " spokes having shrunk from them. With regard to the wood- " work itself at the time of the Committee, it appeared that " many spokes and fellies would require replacing; but when " I saw these Carriages again in August last, the wood had " so swollen during the monsoon (though kept in a dry but " open gun shed) as almost to return, in some instances to " its former iron fastenings and very few cracks were appa- " rent in either spokes or felloes, and as remarked by the " Committee in April, it would be difficult to determine till " the tires are taken off what repairs will be necessary, though, " I am of opinion now that very few of either will require " to be renewed."

" The same remarks will partially apply to the waggons: " there are three ammunition boxes with lids and four with " sides split, and five axletree boxes split, these boxes are of " Teak and the cracks are right through."

" I have again inspected these carriages, and find their " state very little altered since August but sufficient to con- " vince me of the necessity of waiting till the hot season to " repair them; the Saul wood of which they are built seems " most susceptible of the dryness and moisture of the atmos- " phere."

" I consider that the necessary repairs to these carriages " could be done by the Regimental Artificers but not without " the superintendence of an experienced foreman accustomed " to the work."

5th Report. On 12 wheels reported to be unserviceable having shrunk $\frac{1}{8}$ of an inch less than the tire, and the felloes of which had considerably warped from their proper position, in a letter from the Officer Commanding Ceded Districts to the Military Board, dated 12th August, 1850, No. 384.

6th Report. The general opinion of the Officers composing the Artillery Select Committee in Meet-

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ing 164, Article 586, 10th October, 1850, as recorded in their Proceedings. Also in a Minute by Brigadier Montgomerie, C. B., Commandant of Artillery—attached to the same article, dated 5th November, 1850. Again, observe the decrease in weight in the following:—

Weight of the Madras Select Committee.	Cwts.	qrs.	lbs.
Carriage when constructed in 1845, - -	22	2	6
Do. when weighed at the Artillery Depôt on 10th June, 1848, - - - - - -	21	3	25
Difference,....	0	2	9

7th Report. On 24 Waggon and Limber wheels of the Battery attached to D Company 1st Battalion Artillery at Secunderabad, reported unserviceable from having shrunk and become loose, by a Committee of Survey, 8th July 1847.

8th Example. An experimental Peddowk wood carriage, which after having been made up and proved, was reduced in 1848 in its dimensions, and afterwards lost 81 lbs. in weight, (see Article 608, Meeting 168, and Captain Lavie's Minute appended thereto.)

9th Report. Colonel Shirreff, Commanding Horse Brigade in a report dated 11th April, 1851, referring to the Gun Carriages, &c. in use at Brigade Head Quarters which had just been assimilated at the Gun Carriage Manufactory, states as follows:—"with reference to the wood which had been used in assimilating these carriages:—the partitio ns of all the limber boxes were very much shaken." "The wood of the Ammunition and axletree boxes has every appearance of *unseasoned plank* and evidently has been affected by the weather, the cracks in most cases, are from $\frac{1}{10}$ to $\frac{2}{10}$ of an inch in breadth. These carriages are by no means fit for Field Service or a long march."

(Signed) A. F. Oakes, Captain,
Director Artillery Depôt.

19*th April*, 1851.

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MINUTE BY CAPTAIN MAITLAND, SUPERINTENDENT GUN CARRIAGE MANUFACTORY, IN REPLY TO A MINUTE BY CAPTAIN OAKES, DIRECTOR ARTILLERY DEPÔT, AND ADOPTED BY COLONELS BLUNDELL AND ALCOCK, AND CAPTAIN LAVIE.

1. The Minute by Captain Oakes having been adopted by several Members of the Artillery Select Committee who state their entire accordance with its contents, I have thought it expedient to point out for the information of the authorities the inaccuracies it contains.

2. Major Abbott has only recorded his process of seasoning Saul wood at Futtyghur and makes no allusion to any other description of timber. He remarks, "The Madras "Agent will be able to judge whether the precautions ob- "served in the hot and dry climate of Futtyghur, are ne- "cessary, in the more temperate climate of his own Presiden- "cy." In reference to which I stated my opinion that the precautionary measures adopted by Major Abbott in the intensely hot and dry climate of Futtyghur where *Saul* cannot be seasoned in the ordinary way without causing it to split, crack, warp and become useless from seasoning too rapidly, are unnecessary in the more temperate climate of Madras.

3. This opinion has led Captain Oakes into the mistaken notion that I think *all* timber seasons better within the influence of the sea breeze, and that I suppose Saul could not be seasoned more thoroughly inland, whereas "I consider the *humidity* of the sea breeze in a certain degree retards the process of seasoning" and renders it less complete than it would be at Hyderabad, Nagpore, Seringapatam or other places further from the coast, but I attach no importance to Captain Oakes' remark on the saline quality of the atmosphere, as the rain that falls at Vepery is used by Chemists (when it can be obtained) for various purposes instead of distilled water, which is a clear proof that it must be very free from any saline properties.

4. Whatever the measures adopted by the Bengal Agents for seasoning Timber at Futtyghur, they did not prevent the

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wood used for wheels at that Presidency from shrinking. To prove this I quote from the Minute of Bombay Officers on the subject of wheels. " It is on record that the shrinkage of

Special Board Proceedings.

" wheels with wooden naves made in Bengal, " when sent to Futtyghur was as follows, the " naves were reduced in diameter $\frac{1}{8}$ an inch, " the felloes $\frac{1}{8}$ in depth, and $\frac{1}{8}$ in breadth, and that the spokes " shrunk both in breadth and thickness, but the extent is not " mentioned, neither is their shrinkage in length noticed, " from which we may infer, that if there was any, it was to a " very inconsiderable extent, an inference which accords with " practical results; as woods chiefly shrink but very little in " their length in comparison with what they do in their " breadths and thickness."

5. Captain Oakes has entirely misapprehended the 4th and 5th paras, of my minute when he states: " The Superin- " tendent himself attributes the failures in Carriages at " Peshawur in 1842 to the neglect of these Rules and to their " having worked up unseasoned timber." I merely remarked 1st. That the Bombay Agent does not state what the rules for seasoning timber were in 1840 when Captain Leslie's Carriages were built. 2ndly. That if the rules were good they were not always adhered to, it will therefore be seen that I could not attribute the failures in the Carriages at Peshawur to the neglect of rules when I have never heard what they were.

6. It is asserted by the Director of the Artillery Depôt, that General Cullen when Superintendent of the Manufactory established as a practice that timber should only be allowed six weeks to season in a half-wrought state, and that Colonel Frith altered this period from six weeks to two years. General Cullen in the letter I have forwarded for the information of the Artillery Select Committee simply gives the result of many experiments he made on timber at Seringapatam, but does not allude to the practice of the Manufactory, where there was always a very large stock of Heavy and Light Field

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half wroughts in store, to meet any demands however extensive for every description of work. Colonel Frith in his letter to the Military Board states an opinion regarding the time allowed for seasoning timber, but there is no ground for supposing that the time mentioned in his letter was established as a rule of the Department.

7. It is stated "all the Superintendent's arguments in "favor of seasoning half wroughts in six weeks and two "months, seem to be comprised in his own experience, sup- "ported by the opinion of General Cullen, who held the "same appointment previous to 1830, and who writes from "recollection of the practice which then obtained at the Ma- "nufactory." I have explained Captain Oakes' mistakes with regard to both General Cullen and Colonel Frith altering the practice of the Manufactory, and I have now to correct him upon another point, viz., that I have not laid down six weeks or two months as a sufficient time for seasoning all half wroughts, I have laid down the shortest time three months for small articles of Teak wood, such as spokes, and six months for beams and other large parts of Teak; for Saul and Peddowk the time is one, one and a half, and two years for articles according to their size, but Captain Oakes is quite right in saying, that I base my arguments on my experience of 12 years at the Manufactory.

8. The Director of the Artillery Depôt thinks the information I have prepared by order of the Military Board "can- "not be considered as data," He "cannot see what these "Tables have to do with the question" that it is obvious that these Tables "could afford no assistance whatever to the "Committee when determining the proper course of the sea- "soning of wood for Gun Carriage purposes." In my opinion the data afford sufficient information to enable men practically acquainted with the properties of timber, at once to dispose of the question.

9. The most important point in Captain Oakes' minute is noticed in the following extract.

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"Although it was the earnest desire of the Committee to "give the fullest weight to the Superintendent's assertions, "they certainly did not feel justified in receiving them to the "exclusion of the high authorities both in England and in "India, all laying down diametrically opposite views to those "entertained by him. The authorities I allude to are 'Tred-"gold,' 'Barlow,' and in India, the late 'Colonel Frith,'— "'Major Abbott' and the 'Bombay Agent.'" By comparing the opinions of Barlow and Tredgold as quoted by Captain Oakes himself, with General Cullen's own words, it will be seen whether these authorities lay down almost diametrically opposite views, or, whether they entirely agree. "'What "Tredgold calls dried' is identical with 'seasoned,' ac-"cording to 'Barlow,' 'Tredgold' says in page 188, 'I "consider timber dry when it has lost one-third of its weight.' "'Barlow,' says in page 12, 'more than $\frac{1}{3}$ of the weight is "lost in seasoning.'" We may therefore fairly consider the terms "dried" of Tredgold, and "seasoned" of Barlow as synonymous." General Cullen in a letter I have forwarded to the Director of the Artillery Depôt states, "Yes, it certainly "was my impression that 6 weeks or 2 months in plank or "half wrought was quite sufficient *drying* or *seasoning*, I would "rather call it drying, for what I call seasoning is the previ-"ous *storing in log*. I found that logs that had been 4 or 5 "years piled in the forest were well suited for immediate "use, and that 6 weeks drying after being half wroughts, ren-"der them quite fit for use. Teak fresh felled weighed 72 lbs. "the cubic foot, after felling and allowed to be piled 4 or 5 "years and brought to Seringapatam, it weighed 55 or 50 lbs. "—6 weeks more in half wrought state brought it down to 45 "lbs. which seemed to be as dry as could be desired." If 45 is subtracted from 72, it leaves 27 lbs. which is a little more than one-third the weight of newly felled Mysore Teak. I therefore arrive at the conclusion that General Cullen entirely agrees with the home authorities on seasoning timber.

10. It is said there have been a great number of Carriages repaired and become unserviceable within the last two years,

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from the use of unseasoned timber, and though it would be reasonable to expect that Colonel Frith's Carriages would be stronger than mine, as Captain Oakes states that he followed "practically the course of seasoning laid down by the scien- "tific men who have written on the subject," yet, it is a fact recorded by the Special Board, that they likewise failed, and why? "The Board cannot doubt that every care was used, "both at Madras and Bombay in selecting the wood as well "as the Carriages sent round, and could it have been ascer- "tained by inspection, that the wood was in the state they "found it to be at the fractures, it undoubtedly would not "have been used. The Board presume therefore, that the "Madras, as well as the Bombay Agents, have been deceived "by appearances, against which they do not know of any "security for the future; and as in Bengal the difficulty of "selecting Teak wood has been long found to be so great, "that, that wood has in consequence been nearly discontinued "in the principal parts of the Carriages of that Presidency, "the Board are unanimous in condemning the use of this "wood for cheeks, and axle-tree beds, even when the Teak "wood is of the best quality."

11. I am not aware how often the carriages constructed by the Manufactory have been repaired up country, or, when they became unserviceable, but, I should suppose every carriage and cart body, and particularly their wheels are affected more or less by the climate, when removed into the interior. As the Director has brought forward again Brigadier Montgomerie's opinion on the Saul wood question, and alluded to carriages lately sent to Nagpore and Bangalore, which required to be set up, I give an extract from the Proceedings of the Artillery Select Committee of which Colonels Montgomerie and Alcock were Members in which it is admitted by them that Carriage wheels built at Madras "suffer when exposed to the "heat of the climate, at Hyderabad or at Nagpore. There "are frequent instances of wheels constructed in England by "the first workmen, falling to pieces when exposed to the

Proceedings of the Artillery Select Committee, dated 19th October, 1837.

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" hot weather of this country, so may wheels constructed at " Madras in the cold season suffer (although perhaps not in " so great a degree as the English ones,) when exposed to " the heat of the climate at Hyderabad or at Nagpore." Now I conclude the Select Committee in recording the above, believed that the English wheels which fall to pieces are made of what is considered in England fully seasoned timber, not thoroughly dried, for, if dried, then they must have absorbed moisture on the way to India. If made of seasoned Timber, then, we can understand how the heat of this climate has more thoroughly seasoned the wood and caused the joints to open.

12. If the principle laid down by the Committee in the foregoing paragraph is correct it would be readily admitted that the drier climate of the interior, must affect every part of the wood work of the bodies as well as the wheels of Carriages, and it will then be allowed that the most perfect system of seasoning at Madras cannot prevent the Carriages from suffering on first leaving the moist atmosphere of the coast.

(Signed) J. MAITLAND, Captain,
Supt. Gun Carriage Manufy.

GUN CARRIAGE MANUFACTORY,
MADRAS, *28th April*, 1851.

MINUTE BY CAPTAIN A. F. OAKES,
Director Artillery Depôt.
30th April, 1851.

In reply to the Minute of the Superintendent Gun Carriage Manufactory of the 28th of the same month.

1. I regret to observe that the Superintendent of the Gun Carriage Manufactory in his reply to my Minute of the 19th instant, has scarcely extended to me that courtesy in discussion which might have been expected, on a subject wherein the interests of Government, as well as the permanent efficiency of our Regiment, are so deeply involved. I shall however remark briefly upon a few points in his communication, leaving those parts unnoticed, which I consider have been already answered in my former Minute.

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2. The Superintendent in his 2nd and 3rd paras., states, that Major Abbott's opinion on seasoning Saul wood has led Captain Oakes into the "*mistaken notion*" that he (Captain Maitland) "thinks all timber seasons better within the in-"fluence of the sea breeze,"—if the Superintendent *does not* think so, why should he recommend months for seasoning half wroughts at Madras, instead of years? it can be no "*mistaken notion*" of mine to believe in the axiom that "*the same ge-*"*neral principles, which, in seasoning, are applicable to one*"*description of wood, are applicable to all.*"

3. In the 3rd para. of his first Minute, the Superintendent remarks on the favorable effect of the temperate climate of Madras, in shortening the seasoning process. In the 12th para. of his second Minute, he alludes to the Madras atmosphere as "*the moist atmosphere of the coast.*" In the 3rd para. of the same Minute he states, "*I consider the humidity of the sea breeze in a certain degree retards the process of seasoning.*" Yet in the face of all this, the Superintendent recommends *months for seasoning instead of years*, at a place where *he admits seasoning is retarded by the atmosphere.*

4. I beg that the Superintendent's statements Nos. 1 and 2 appended, may be attentively examined, in order that, the various discrepancies in his periods for seasoning half wroughts, as officially recorded by him, may be borne in mind, as we proceed to investigate this subject, and to prevent misconception, I shall distinguish the Superintendent's two *systems of seasoning** under the separate designations of

* Exhibited in No. 1 and No. 2 Statements.

1st.—"*Practical seasoning data.*"

2nd.—"*Theoretical seasoning data.*"

The very limited period of seasoning given in his Statement No. 1, viz., from twenty-three days to eighty-eight days, may fairly be considered the result of his 12 years' experience, I therefore call it his "*practical seasoning data*"—the more lengthened period subsequently recorded by the Superintendent in his Statement, No. 2, may be looked upon as his "*theoretical seasoning data:*" the salutary addition of several months for seasoning given in No. 2 Statement, has been adopt-

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ed, it would seem, between the months of November 1850, and February 1851, which are the dates of the two statements; whatever may have been the cause of the change, few will deny that the lengthened seasoning was a step in the right direction, but the "practical seasoning data" in Statement No. 1, is the one in which we are now concerned, and I shall have occasion to refer again to it hereafter.

5. In the latter part of the 3rd para. of his last Minute, the Superintendent by way of proving that the Madras atmosphere is free from any saline properties, notices, that the "Vepery chemists use rain water instead of distilled water for various purposes." The Superintendent surely cannot intend to argue, that because he has shown the rain water which falls at Vepery to be pure rain water, and free from any saline properties, therefore, the sea atmosphere must be also free from saline properties? It has hitherto, I believe, been considered an undeniable fact in natural philosophy, that *sea air is impregnated* with saline particles, and equally undeniable, that *rain water* in whatever locality it may fall, *is not so impregnated.*

6. In his 7th para. the Superintendent states, "I have ex- "plained *Captain Oakes' mistakes* with regard to General Cul- "len and Colonel Frith altering the practice of the Manufac- "tory." Whether *the mistake* is on my part or on the Superintendent's, let the following facts decide.

General Cullen's practice in seasoning as recorded in the Document submitted by the Superintendent to the Select Committee, gives a period of "6 *weeks for half wrought seasoning.*" Colonel Frith, his immediate successor as Superintendent of the Gun Carriage Manufactory, in his letter to the Military Board, dated 7th March, 1835, established a period of *two years for the same process of half wrought seasoning.* Is not this "altering the practice of the Manufactory?" I maintain that from the day on which the Superintendent (Colonel Frith) announced in his official letter to the Military Board, that *a period of two years was necessary for half wrought seasoning*, that official declaration became, de facto, a rule in the Gun Carriage Department, of

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which Colonel Frith was the Superintendent, and on the Records of that Department, *this rule now stands recorded, and* (as far as the Committee can judge from the information laid before them,) *unreversed.*

Again in the same para. :—"I have now *to correct* Captain "Oakes on another point, viz., that I have not laid down six "weeks or two months as a sufficient time for seasoning all "half wroughts, I have laid down the shortest time 3 months "for small articles of Teak wood such as spokes, and six "months for beams." Let a reference be made to the Superintendent's Statement No. 1, "*practical seasoning data,*" and it will be seen that the Superintendent *gives, even less, than the time I have stated.*

7. Adverting to his 8th para. I would observe that my reference is to the quality, not to the quantity of the information afforded by the Superintendent's data; and with all deference, I must re-assert that his data are diametrically opposed, as far as seasoning is concerned, to the highest authorities in England and in India;—under this view I maintain that Tables so prepared can afford no assistance whatever to the Committee. In questions admitting of almost mathematical solution, it is necessary that the data be sound, otherwise it must be worse than useless. If the Superintendent had steadily adhered to one system of seasoning, based upon his own practical experience, as well as that of his predecessors, and had satisfied the Committee that he had made experiments to justify their agreeing with and supporting him in his views, the question could have been disposed of at once according to his wishes; but instead of this, the Superintendent merely makes a number of assertions without a vestige of an argument to prove their correctness, and with the glaring discrepancies exhibited in his statements on seasoning, already referred to, how could he reasonably expect that the Committee would place reliance on his data? which under these circumstances, I maintain, cannot but be *utterly valueless both to "men practically acquainted with the properties of timber," as well as to those who are merely guided by common sense and observation.*

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8. The Superintendent in his 9th para. again quotes Colonel Cullen, "six weeks or two months in plank or half "wroughts is quite sufficient for drying or seasoning." Every one must admit that the length of time in seasoning is governed by the depth of the timber—now what analogy can possibly exist in a plank usually from 1 to 1½ inch thick and a beam of half wroughts 6 inches deep? it may be fairly questioned, whether six weeks be sufficient even for a plank: how infinitely inadequate then it must be for a beam. Tredgold in page 180 when laying down the time of seasoning for a half wrought of the latter size, gives 29 months! Colonel Shirreff of the Horse Brigade in reporting, a week ago, upon 24 Carriages which had been fitted up with *new Ammunition boxes* in the Gun Carriage yard in December last, states, that "the wood of the Ammunition and axle-tree boxes has every "appearance of unseasoned plank, and evidently has been "affected by the weather." In the same para. the Superintendent quotes General Cullen as entirely agreeing in his mode of seasoning with the home authorities, and in proof of it he illustrates a case where ⅓ of the weight lost was considered by General Cullen as seasoned timber. This loss of ⅓ in seasoning agrees with Barlow page 12, and with what Tredgold calls dried in page 188, and coincides with the opinion given by Captain Lavie in his Minute of 21st April, 1851,* when remarking on the unseasoned state of the Peddowk wood Carriage; but is opposed, I think, to the Superintendent's opinion given in his Minute on the same Article, viz., that ¼ loss of weight was considered by the Home authorities as seasoned, so that Tredgold, the only Home authority quoted by the Superintendent, is brought forward by him in one case to prove that ¼ loss of weight is sufficient seasoning, and in another case, it may be inferred that he considers ⅓ loss of weight to be the true criterion of properly seasoned wood; see the concluding part of his 9th para.

* Article 608, Page 189.

(Signed) A. F. Oakes, Captain,
Director Artillery Depôt.

Artillery Depot,
30*th April*, 1851.

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STATEMENT No. I.

25th November, 1850.

Extracted from a Statement sent to the Military Board, by the Superintendent of the Gun Carriage Manufactory, dated 25th November, 1850, showing the actual periods of seasoning.

CALIBRE OR DESCRIPTION OF CARRIAGE.	Marks on the Carriage.			Pattern.	Beams.		Cheeks.	
	Initial Letter of Superintendent.	Year of Construction.	No. of Carriage.		Of what Wood.	No. of days in Half wrought state before being worked up into Carriages.	Of what Wood.	No. of days in Half wrought state before being worked up into Carriages.
A Troop.						Days.		
Car. Howr. 12 Pdr.	J.M.	1848	6	A. S. C. Pattern.	Moulmein Teak.	28		
,, ,, 12 ,,	,,	,,	5	,,	,,	30		
,, Gun. 6 ,,	,,	,,	5	,,	Saul.	41	Saul.	36
,, ,, 6 ,,	,,	,,	4	,,	,,	44	,,	37
,, ,, 6 ,,	,,	,,	6	,,	,,	48	,,	40
,, ,, 6 ,,	,,	,,	7	,,	,,	43	,,	30
,, ,, 6 ,,	,,	,,	8	,,	,,	33	,,	30
D Troop.						Days.		
Carriage Gun 6 Pdr.	J.M	1848	9	A. S. C. Pattern.	Saul.	27	Saul	RC. 28 / LC. 39
,, ,, 6 ,,	,,	1849	11	,,	,,	RB. 51 / LB. 61	,,	RC. 0 / LC. 65
,, Howr. 12 ,,	,,	,,	9	,,	,,	RB. 64 / LB. 62	,,	RC. 36 / LC. 30
,, ,, 12 ,,	,,	,,	8	,,	,,	RB. 64 / LB. 67	,,	RC. 47 / LC. 46
,, ,, 12 ,,	,,	,,	7	,,	,,	RB. 64 / LB. 109	,,	RC. 60 / LC. 47
,, ,, 6 ,,	,,	,,	10	,,	,,	RB. 109 / LB. 102	,,	RC. 53 / LC. 59
Field Train.						Days.		
Car. Howr. 12 Pdr.	J.M.	1849	12	A. S. C. Pattern	Saul.	RB. 6 / LB. 36	Saul.	RC. 46 / LC. 40
,, Gun 9 ,,	,,	,,	10	,,	,,	RB. 56 / LB. 29	,,	RC. 35 / LC. 53
,, ,, 9 ,,	,,	,,	11	,,	,,	RB. / LB. 26	,,	RC. 51 / LC. 71
,, ,, 6 ,,	,,	1848	7*	,,	,,	43	,,	RC. 30 / LC. 39
,, ,, 6 ,,	,,	,,	8	,,	,,	33	,,	RC. 30 / LC. 40
,, ,, 6 ,,	,,	1849	12	,,	,,	RB. 25 / LB. 36	,,	RC. 51 / LC. 37
,, ,, 6 ,,	,,	,,	13	,,	,,	RB. / LB. 74	,,	RC. 39 / LC. 23
,, ,, 6 ,,	,,	,,	14	,,	,,	RB. 40 / LB. 67	,,	RC. / LC. 78
,, ,, 6 ,,	,,	,,	15	,,	,,	RB. 62 / LB. 61	,,	RC. 37 / LC. 78
,, ,, 6 ,,	,,	,,	16	,,	,,	RB. 39 / LB. 38	,,	RC. 53 / LC. 42

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CALIBRE OR DESCRIPTION OF CARRIAGE.	Marks on the Carriage.			Pattern.	Beams.		Cheeks.	
	Initial Letter of Superintendent.	Year of Construction.	No. of Carriage.		Of what wood.	No. of days in half wrought state before being worked up into Carriages.	Of what wood.	No. of days in half wrought state before being worked up into Carriages.
						Days.		Days.
Car. Gun 6 Pdr.	I M.	1849	17	A. S. C. pattern.	Saul.	RB. 55 LB. 54	Saul.	RC. 44 LC. 59
" " 6 "	"	"	18	"	"	RB. 46 LB. 45	"	RC. 37 LC. 55
" " 6 "	"	"	19	"	"	RB. 45 LB. 53	"	RC. 55 LC. 37
" " 6 "	"	"	20	"	"	RB. 45 LB. 52	"	RC. 47 LC. 37
" " 6 "	"	"	21	"	"	RB. 45 LB. 46	"	RC. 45 LC. 55
" Howr. 24 "	"	1848	3	"	Moulmein Teak.	39	Moulmein Teak.	—
" " 24 "	"	1849	4	"	Saul.	RB. 63 LB. 67	Saul.	RC. LC. 61
" " 24 "	"	"	5	"	"	RB. 45 LB. 49	"	RC. 38 LC. 35
" " 24 "	"	"	6	"	"	RB. 38 LB. 45	"	42
" " 24 "	"	"	7	"	"	88	"	RC. 64 LC. 26
" Gun 9 "	"	"	2	"	"	RB. 51 LB. 101	"	RC. 47 LC. 46
" " 9 "	"	"	3	"	"	RB. 54 LB. 50	"	44
" " 9 "	"	"	4	"	"	RB. 27 LB. 67	"	RC. 75 LC. 68
" " 9 "	"	"	5	"	"	RB. 53 LB. 26	"	RC. 63 LC. 62
" " 9 "	"	"	6	"	"	RB. 55 LB. 52	"	RC. 54 LC. 55
" " 9 "	"	"	7	"	"	RB. 44 LB. 35	"	RC. 55 LC. 23
" " 9 "	"	"	8	"	"	RB. 45 LB. 43	"	RC. 27 LC. 36
" " 9 "	"	"	9	"	"	RB. 55 LB. 51	"	RC. 28 LC. 34

(Signed) J. MAITLAND, Captain,
Supt. Gun Carriage Manufactory.

(True Extract.)

ARTILLERY DEPÔT, *Saint Thomas' Mount.* (Signed) A. F. OAKES, Captain,
Director Artillery Depôt.

N. B.—R. B. Right Beam. R. C. Right Cheek.
L. B. Left Beam. L. C. Left Cheek.

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STATEMENT No. 2.

6th February 1851.

Extracted from a Statement sent to the Military Board by the Superintendent Gun Carriage Manufactory, dated 6th February 1851, *showing the proposed periods of Seasoning.*

Description of Timber.	Period required to season in half wrought.	The Scantling of each required.		
		Length.	Breadth.	Thickness.
		Feet.	Ins.	Ins.
Teak Malabar.	From 3 to 6 months.	10 to 20	30 to 15	24 to 12
Teak Moulmein.	do.	10 to 20	30 to 15	24 to 12
Teak Coimbatore or Annamallay.	The same as Malabar Teak.			
Teak Lymbooreah.	The same as Moulmein Teak.	15 to 30	16 to 9	14 to 9
Teak sheathing Boards.	do.	13 to 18	9 to 6	1 to ¾
Saul.	For beams and large component parts—2 years—for those of small scantling 1 year.	10 to 20	30 to 15	24 to 12
Peemah Red.	From 1 year to 6 months.	10 to 15	24 to 15	18 to 12

(Signed) J. Maitland, Captain,
Supt. Gun Carriage Manufactory.

(A true Extract.)

Artillery Depôt, *Saint Thomas' Mount.* (Signed) A. F. Oakes, Captain, *Director Artillery Depôt.*

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MINUTE BY THE SUPERINTENDENT OF THE GUNPOWDER MANUFACTORY.

Having carefully re-perused the Minute of the Director of the Artillery Depôt, dated 19th April with the reply from the Superintendent of the Gun Carriage Manufactory, dated 28th April, I see nothing in the latter document which is not to my mind satisfactorily answered in the Minute of the Director of the Artillery Depôt, dated 30th April.

The opinions of Major General Cullen and the late Lieut. Colonel Frith are quoted by the Superintendent of the Gun Carriage Manufactory; it is well to remember that during the periods these officers were in charge of the Gun Carriage Manufactory there was no difficulty whatever in procuring teak of prime quality fully equal to the demand for it, consequently a large supply both in log and half wroughts was constantly on hand imperceptibly as it were undergoing *thorough* seasoning, so that prime wood thoroughly seasoned was ever available for use, of late years it has been very different, with great difficulty a fair description of wood has been procurable only, and in my opinion haste, to a very injurious extent, has been made to bring it into use.

(Signed) T. LAVIE, Captain,
Supt. Gunpowder Manufactory.

POWDER MILLS,
2nd May, 1851.

MINUTE BY CAPTAIN J. MAITLAND,
Superintendent Gun Carriage Manufactory.

1. In my former Minutes I consider I have fully met what I conceived to be the errors in the resolution of the Artillery Select Committee and the mistakes subsequently recorded by the Director of the Artillery Depôt.

2. I must decline being drawn into a discussion on the Saul Carriage question, as the Members of the Artillery Select Committee are well aware, although no Minute of Con-

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sultation has been forwarded to them, that it would be disrespectful on my part to do so, when that subject has so lately been submitted by the Military Board to Government and finally disposed of.

(Signed) J. MAITLAND, Captain,
Supt. Gun Carriage Manufactory.

GUN CARRIAGE MANUFACTORY,
MADRAS, 12*th May* 1851.

ARTICLE 610.

TWO INSTRUMENTS FOR LAYING MORTARS BY CAPTAIN H. CONGREVE, AND 2ND LIEUT. H. D. GLOAG.

On two different Instruments for laying Mortars, &c.

1st. An Instrument for laying and elevating Mortars proposed by 2nd Lieut. H. D. Gloag, and made up at the recommendation of the Select Committee.*(a)* (Plate 7.)

(a) Meeting 160, Article 565, Page 38.

2nd. A contrivance for laying Mortars by Captain H. Congreve, consisting of a light staff 3½ feet long, armed at one end with a spike like a linstock to stick in the ground, and sustaining at the other a frame of brass or box-wood one foot long and 2½ inches broad, vertically intersected by a thin wire. (Plate 33.)

OPINION.—2nd Lieut. H. D. Gloag's invention is very creditable to that Officer's ingenuity, but is too complicated for service purposes: that of Captain H. Congreve's, the Committee consider well worthy of trial, and would recommend one being made up at the Artillery Depôt for use at the next Practice at Artillery Head Quarters.

Extract from letter No. 2814, *from the Secretary Military Board, to the Brigadier Commandant of Artillery, dated* 13*th May* 1851.

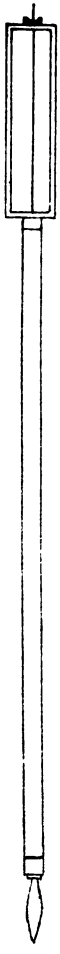
I am instructed by the Military Board to convey to you their authority for an instrument for laying Mortars (as pro-

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Artillery Select Committee.

Meeting 168, Article 610.

Instrument for Laying Mortars, by Captn H. Congreve.



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posed by Captain Congreve) being made up at the Artillery Depôt, for use at the next Practice at Artillery Head Quarters, and the Board request that the result of the trial may be communicated to them.

ARTICLE 611.

Experimental Mortar Cart and Platform combined, by the Superintendent of the Gun Carriage Manufactory. Plates 25 and 26.

Memorandum of the Director Artillery Depôt.

1. "The tests to which this Experimental Cart and Platform have been submitted are the following.

During the last quarter of 1850, the Cart with an 8 Inch Mortar and Bed was taken to the foot of the road up the slope of the Mount with six bullocks in single yoke, and ascended a few yards (the slope is 1 in 12 feet), it became necessary to add another pair of leaders; at the second slope (2nd slope is 1 in 7) an additional pair were yoked on, when they crowned the slope; the cart was afterwards lowered by hand. With ten bullocks in two quadruple yokes and one single one, it proceeded with a 10 Inch Mortar and bed a short circuit on the Cantonment roads, apparently with ease.

2. A 10 inch Mortar and Bed were placed on the Cart and taken a march with ten bullocks in yoke in the direction of Palaveram; and on the following morning to the Practice Ground and over the river for 4 days, during wet weather.

3. The Platform was used during the Annual Practice at Head Quarters in 1851, first with an 8 inch, and afterwards with a 10 Inch Mortar, the result was as follows:—

4. The Platform was laid in the usual manner, and used with an 8 Inch Iron Mortar for eight days. Great difficulty was experienced in running up the Mortar after each round, owing to the Bed being lower than the upper surface of the frame, not leaving sufficient room to admit of the handspikes

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passing under the traversing bolts. From the heads of the traversing bolts touching the side bars of the frame work, the left side bar was much splintered at the recoil. It was afterwards used for the remaining 11 days' Practice with a 10 inch Mortar."

OPINION.—The limited experiments which have been made, show that this cart, weighing about 400 lbs. lighter than our present pattern of Heavy Mortar Cart and 440 lbs. heavier than our 2nd sized Mortar Cart, is adequately strong to carry the weight allotted to the former, viz. one 10 inch Mortar and its bed weighing Cwts. 37-1-11, or two 8 inch Mortars with their beds weighing together Cwts. 39-1-16, and that when the frame work is used as a platform, the level is preserved equally well with any other beds of similar construction (*Miller's Bombay*).

2. At first sight, it may appear very convenient to have a Cart made with its frame work answering as a platform, provided that, after the removal of the wheels and axletree, it could at once be placed on its sleepers, and the mortar be made ready for service in Battery with greater expedition ; but in practice this is not the case, as the following has been found the necessary course of procedure.

1st. The Cart is brought into Battery and the Mortar and bed is dismounted.

2nd. The wheels are taken off.

3rd. The axletree has then to be disengaged, after which, the sleepers are placed, and the process goes on as on ordinary occasions ; so that the operation of bringing a bed with its mortar into Battery is more tedious and complicated, with the additional trouble of having a pair of cumbersome wheels pole and axletree with each mortar to be looked after, which is objectionable.

3. There is a probability of some of the Nuts, &c. for fastening on the axletree being lost or mislaid, which would occasion much delay and trouble in fitting the axletree to the Platform, which is another objection : As it is not proposed nor

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does it appear desirable that this Cart should supersede the use of the heavy or light Mortar Cart, the Committee do not consider it to possess sufficient advantages to recommend its being introduced into the Service as an additional Cart to those already in use.

DECISION.—The Military Board concur in the opinion of the Committee. The Cart will be sent to the Gun Carriage Manufactory, and the materials of which it is composed will be appropriated to such purposes as may be most advantageous to the public service. *(See Military Board's letter, No. 2878, to the Superintendent Gun Carriage Manufactory, dated 13th May 1851.)*

ARTICLE 612.

ON THE PATTERN OF HOOKS FOR HEAVY FIELD TRACE CHAINS.

(a) No. 325, 17th January 1851. The Military Board call [a] for the opinion of the Select Committee on the Hooks of Heavy Field Trace Chains reported to be of insufficient strength.

The following Documents are laid before the Committee.

(b) No. 336, 5th Nov. 1850. 1. *Letter from the Commissary of Ordnance N. S. F. to the Secretary Military Board.* [b]

(c) No 670, 3rd Dec. 1850. 2. *Letter from the Brigadier Commandant of Artillery, to the Secretary Military Board.* [c]

(d) No. 8, 2nd Jan. 1851. 3. *Letter from the Commissary of Ordnance N. S. F. to the Secretary Military Board.* [d]

OPINION.—In comparing the present established Bengal pattern of Heavy Field Trace Chain Hook, complained of, with the old Madras pattern, the Committee are unanimously of opinion, that the old pattern is preferable and should be restored, it being superior both in shape and dimensions and consequently better adapted from its greater strength for service purposes.

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DECISION.—Before coming to any decision on the matter of Heavy Field Trace Chain Hooks, the Military Board have ordered the Commissaries of Ordnance at Secunderabad and Nagpore, to make up some old pattern hooks as an experiment and try them against the present and established pattern hooks; a report of the result will be submitted to the Board with drawings illustrative of the experiment. *(See Military Board's letter, No. 2893, to the Commissaries of Ordnance at Nagpore and Secunderabad, dated 13th May 1851.)*

ARTICLE 613.

METAL FUZES OF A PATTERN INVENTED BY LIEUTENANT OLPHERTS OF THE BENGAL ARTILLERY.

OPINION.—On a former occasion, when certain experiments, which had been made with these fuzes at Artillery Head Quarters and at Secunderabad in 1848 and 1849, were laid before the Committee, it was recommended that some of the fuzes should be procured from Calcutta made under the immediate directions of Lieut. Olpherts and afterwards sent to the Committee for final report. Twenty of these fuzes have been prepared accordingly, and were used with Spherical Case, in the Light Field Battery at the last Annual Practice and out of the 20 fuzes which were set, 4 caused the shells to burst, and 16 failed. This pattern of fuze therefore cannot, in the opinion of the Committee, be recommended for Artillery Service.

Meeting 157, Art. 538, 17th September 1849.

ARTICLE. 614.

ON TWO 12 POUNDER IRON GUNS THE BORES OF WHICH ARE INJURED BY THE BOUCHE ENTERING THE BREECH.

The Military Board direct [a] that two 12 Pdr. Iron Guns, the bores of which are injured by the Bouche entering the Breech, be sent to the Arsenal of Fort Saint George to have a portion of the Breech reamed out

(a) No. 5516, 2nd October 1850.

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to clear the Bouche, and with reference to the proceedings (b) of the Permanent Artillery Select Committee on the question, whether Ordnance, is rendered unserviceable by the Bouche entering the breech, the Military Board request that these pieces when returned may be examined and proved in presence of the Artillery Select Committee with a view to a final opinion being recorded in reference to Article 491 of Meeting 146.

(b) Meeting 146, Article 491, Page 721.

Meeting 158, Article 543, Page 1009.

OPINION.—The reaming out of a portion of the Breech of these 12 Pdr. Guns has rendered the pieces perfectly serviceable.

DECISION.—" The two 12 Pdr. Guns to be brought on the Return of the Field Train."—*(See Military Board's letter No. 2793, to the Brigadier Commandant of Artillery, dated 10th May 1851.)*

ARTICLE 615.

ON ASSIMILATING THE ESSENTIAL POINTS OF WAGGONS IN USE WITH THE MADRAS ARTILLERY.

The Military Board forward (a) a letter (b) from the Superintendent Gun Carriage Manufactory on the subject of the assimilation of the essential points of the Waggons in use with the Madras Artillery, also a Memorandum (c) of the most essential alterations necessary for assimilation, and call for the opinion of the Select Committee, as to whether these will be sufficient to prevent actual inconvenience to the service.

(a) No. 782, 31st January 1851.

(b) No. 72, 28th January 1851.

(c) No. 151, 16th January 1851. From the Mily. Board, to the Supt. G. C. M.

Printed Circular, No. 6470.

Extract from Memorandum, No. 151, from the Military Board, dated 16th January 1851.

" The essentials of assimilation in Waggons and Limbers are simply as follows :—

All arms of axles are to be Artillery Select Committee Pattern—All pintles are to be assimilated—All wheels are to go

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on to the axle arm made as above—All pintles loops are to go on to pintles fashioned as above."

OPINION.—The Committee consider that, with the addition of the assimilation of the boxes of waggons, the several parts noticed in the Military Board's Memorandum, No. 151, dated 16th January 1851, include all the essentials of assimilation for service purposes.

ARTICLE 616.

ON FLOATING ROUND SHOT, IN QUICKSILVER, TO ASCERTAIN WHERE THE CENTRE OF GRAVITY IS *NOT*.

The following proposition of Captain (Bt. Major) P. Anstruther C. B., of the 4th Battalion Artillery is submitted.

"That all round shot be floated in quicksilver, to ascertain where the centre of gravity is *not*, and a patch of white paint forthwith placed on the upper surface of the still floating shot, orders being given that in all cases of fixing a bottom, or a grummet to a shot, it is to be fixed on the painted part: in case of shot loose, being used, then the order to be general, that the shot in loading a Gun is to be inserted *paint foremost*."

The object of the Experiment being—

1st. To test the correctness of the rule laid down in Artillery Records—Miscellaneous, Page 728, viz. the rule that if in a ball the centre of gravity is to be right, the ball will go to the right, if to the left, the ball goes to the left.

2nd. To ensure the same diameter being measured by all parties measuring a shot.

OPINION.—A similar experiment to that which was made at Artillery Head Quarters in March 1840, with shells partly filled with sand and lead, would be much more likely to decide the question, than by the adoption of the proposition made by Major Anstruther, C. B.; the latter, in the opinion of the Committee would entail a great deal of trouble, without a probability of arriving at any satisfactory conclusions, for if,

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as in the case of the experiment of 1840, thirty shots were fired with shells ½ filled with lead close to the fuze hole, without being able to discover whether the leaded side of the shell had been placed in the bore to the right or left of its axis, in consequence of the regularity of the direction of the fire ; how much less reason would there be to expect the discovery of any deviation to the right or left of the line of fire, when using round shot whose centre of gravity had been ascertained by being floated in quicksilver.

2. As to testing shot of a larger calibre than a 9 Pdr. in this way, it could not be accomplished ; because in loading Battering Guns, the shot is inserted loose, and therefore its being sent home with the painted part next the cartridge could not be ensured.

3. The minimum size of a cylinder in which a 9 Pdr. shot could be floated conveniently leaving sufficient room to take out the shot by hand is in diameter 5·4 inches ; it requires 6 lbs. 9 ozs. to float a 9 Pdr. in such a cylinder, and the cost of the quicksilver would be 23 Rupees.

4. The correctness of the rule, viz. whether a ball with its centre of gravity to the right, will go to the right and vice versâ can be tried with 50 shells filled with sand and lead from a 9 Pdr., which will probably meet with the Military Board's approval as being attended with little or no expense, and likely to decide the question satisfactorily.

Decision.—The above experiment sanctioned (*See Military Board's letter No. 2844, to the Brigadier Commandant of Artillery, dated 13th May* 1851.

ARTICLE 617.

Brass Naves of reduced Dimensions.

On two brass Naves of reduced dimensions which were experimentally constructed for a Break Carriage recommended

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by the Select Committee* to be tested by Officers Commanding Corps and Detachments at Artillery Head Quarters.

* Meeting 159, Article 556, 28th February 1850, Page 25.

OPINION.—These Naves have now been in use with the Break Carriage for about eight months, and have been very favourably reported on, but so long as our wheels are kept at their present height of five feet, and the axletree body of the length laid down for the Artillery Select Committee's Pattern Carriages, it would not be safe to reduce the Nave boxes from ten to seven inches, as the distance between the wheels of the Artillery Select Committee's Pattern Carriages could not be so reduced, without rendering them liable to upset, and thereby endangering the lives of the Artillerymen. The upper and under plates of the established pattern Nave are in the opinion of the Committee unnecessarily thick, and may be reduced with perfect safety to the dimensions of the Naves of the 6 Pdr. Waggon with reduced wood and iron work, lately constructed. This would cause a reduction of about fifteen pounds weight in each Nave, or sixty pounds in the weight of the Carriage and Limber. The Committee consider that this improvement might not only be advantageously adopted in all future constructions, but also in the assimilation of Carriages which are in course of progress.

DECISION.—That a further experiment be instituted by fitting the four Wheels of reduced dimensions already at St. Thomas' Mount of Naves, as also of wood work on a Gun Carriage in use with the Horse Artillery at St. Thomas' Mount; to be reported on six months from the date of their being put into use. *(See Extract from Military Board's Proceedings, No. 2849, dated 13th May* 1851.)

ARTICLE 618.

CAPTAIN BOXER'S NEW MODE OF BORING A FUZE, MODIFIED BY LIEUT. A. N. SCOTT FOR USE WITH SPHERICAL CASE SHOT.

Captain Boxer to obviate the inconvenience which is ex-

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perienced in actual warfare, when having to saw off the fuze, which sometimes cracks the composition, and causes the shell to burst before it reaches its destination, suggested a plan of boring a small hole in the fuze at the required length.

Extract of a Letter from Lieut. A. N. Scott, dated 13th July 1850, Aden, to Captain A. F. Oakes, D. A. D.

" Captain Boxer appears only to have tried his suggestions " with shells requiring a Fuze longer than an inch, and with " the object of giving a preference to boring, over sawing, " but I think it could also be made applicable to Spherical " Case firing from Field pieces—for instance."

" The thickness of the Spherical Case Shell at the fuze hole " is about $\frac{1}{10}$ of an inch, so allowing the cup of the fuze to be " $\frac{1}{10}$ and that $\frac{4}{10}$ of the same is outside, when the fuze is set " it follows that Captain Boxer's plan would not answer if " the length of fuze required was less than $\frac{5}{10}$ of an inch, as, " if less, the hole bored would not clear the neck of the fuze " hole :—to remedy this,I propose cutting a groove along each " side of the fuze from the bottom of the cup to the end (per- " haps a groove on one side would be sufficient) into which a " piece of quick-match could be introduced leading from the " hole bored down into the shell—the hole should be about " $\frac{1}{10}$ of an inch in diameter and could be made in a few se- " conds with a brace and bit."

Fuzes on the plan suggested by Lieut. Scott having been used with common shell and Spherical Case Shot with two 24 Pdr. Howitzers in the Light Field Battery at the annual Artillery Practice in 1851, the Practice Report is laid before the Committee.

Opinion.—Twenty rounds of Spherical Case were fired with a hole bored in the fuze, a portion of them with quick-match passed through the hole, and a portion without quick-match ; and twenty fuzes were bored at different lengths with starting bags attached ; the whole of the fuzes without a single

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exception caused the powder in the shell to ignite at the time intended.

2. The Committee however prefer the Common method of preparing a fuze, for the following reasons.

1st. It is easier to saw a fuze to a given length than to bore a hole exactly through the centre of a cylinder.

2nd. The length of the fuze when uncut necessitates a diminution of the number of balls in the Spherical Case, which is a great objection.

DECISION.—That the Brigadier Commandant of Artillery be requested to notice to Lieutenant Scott the ingenuity which the Board consider he has displayed in the modification suggested by him for boring Fuzes for Spherical Case Shot. *(See Extract from Military Board's Proceedings, No. 2843, dated 13th May 1851.)*

ARTICLE 619.

BRASS COLLARS TO ENABLE A 4⅘ INCH MORTAR BEING FIRED FROM A 5⅕ INCH MORTAR BED.

The brass collars for enabling a 4⅘ inch Brass Mortar to be fired on a 5⅕ inch Mortar Bed, having undergone the Proof recommended by the Select Committee, *(a)* and sanctioned by the Military Board *(b)* they are again submitted for the report of the Committee.

(a) Meeting 167 Article 600. Page 167.
(b) No. 971, 24th February 1851.

OPINION.—It may be convenient to have a pair of brass collars of this pattern at each Arsenal with a view of a 4⅘ inch Mortar, on an emergency, being used on a 5⅕ inch bed. The collars answer to perfection.

ARTICLE 620.

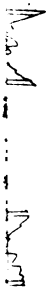
ON THE CONSTRUCTION OF A GUN CARRIAGE OF TEAK WITH REDUCED DIMENSIONS.

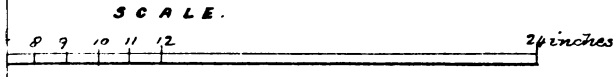
The Military Board forward *(a)* a letter from the Superintendent Gun Carriage Manufac-

(a) No. 1402, 7th March 1851.

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Madras

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C.B.

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(b) No. 149, 3rd March 1851.

tory (b) with the view to obtain the opinion of the Select Committee as to whether the reduction in the wood work of a 12 Pdr. Howitzer Carriage ordered to be constructed of Teak should be made in a similar manner to the Carriage already constructed of Peddowk.

OPINION.—The Committee disapprove of building a Gun Carriage of Teak with reduced dimensions in the wood work, as they consider that a reduction cannot be made with safety.

ARTICLE 621.

ON ADAPTING CRADLES TO CARRIAGES OF THE DOUBLE CHEEK PATTERN.

(a) No. 1591, 15th March 1851. Page 160.

The Military Board forward (a) a statement of the number of Carriages of the double cheek pattern which have broken down, and call for the decision of the Select Committee on the subject of adapting cradles to Carriages of this pattern referred to in a former Meeting,* with a view to remedy a defect which has caused their frequent failure.

* Meeting 167, Article 598. Page 160.

OPINION.—As the records of the Regiment exhibit the fracture of 1 in 7 out of the 253 Carriages which have been built of the double cheek pattern, the Committee would recommend the adoption of the cradled transom to all Carriages of Cullen's, and of the Special Board Pattern; each being fitted and finished as shown in the accompanying drawings (Plate 34.)

DECISION.—The introduction of the cradled transoms to all double cheek Carriages as suggested by Major Anstruther, C. B. approved of; the Brigadier Commandant of Artillery and Superintendent Gun Carriage Manufactory requested to introduce this alteration into the assimilation paper. *(See Extract from Military Board's Proceedings, No. 2845, dated 13th May 1851.)*

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MEETING 169.

EXTRACT FROM THE PROCEEDINGS OF THE PERMANENT ARTILLERY SELECT COMMITTEE, ASSEMBLED BY ORDER OF COLONEL F. F. WHINYATES, BRIGADIER COMMANDANT OF ARTILLERY.

Artillery Depôt, Saint Thomas' Mount, 12th April 1851.

Present.

LIEUT. COL. F. BLUNDELL, C. B. *Principal Commissary of Ordnance.*
LIEUT. COL. H. S. FOORD, *Commanding 4th Battalion Artillery.*
LIEUT. COL. G. ALCOCK, *Commanding 2nd Battalion Artillery.*
MAJOR P. J. BEGBIE, *Commanding 5th Battalion Artillery.*
MAJOR J. BACK, *4th Battalion Artillery.*
CAPTAIN T. LAVIE, *Superintendent Gunpowder Manufactory.*
CAPTAIN J. MAITLAND, *Superintendent Gun Carriage Manufactory.*
CAPTAIN A. F. OAKES, *Director Artillery Depot.*
CAPTAIN B. W. BLACK, *Assistant Adjutant General of Artillery.*

ARTICLE 622.

STATEMENTS AND DRAWINGS OF THE ALTERATIONS TO BE MADE IN THE ASSIMILATION OF GUN CARRIAGES, &c.

A Statement, exhibiting the alterations to be made to the four existing patterns of Gun Carriages, Limbers, Waggons, &c., for the purpose of their assimilation, dated 23d January 1851, bearing the signature of the Superintendent of the Gun Carriage Manufactory, is laid before the Committee together with 17 Drawings ; also letter No. 1025, from the Military Board, to the Brigadier Commandant of Artillery, 11th February 1851.

The Military Board have directed* that the above statements and 17 Drawings be submitted to the Select Committee, with the view of their contents being carefully examined and compared with the printed Statement which accompanied the

* Letter No. 1035, from Military Board, to Brig. Com. of Arty. dated 11th Feb. 1851.

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present occasion, the whole have been inserted in red ink. The changes recommended in Article 625 have also been included with the exception of the cradle referred to in Article 621 of Meeting 168 and of the reduction of the nave plates in Article 617. These can be added hereafter should they be sanctioned.

DECISION.—That the papers be forwarded to the Superintendent Gun Carriage Manufactory with instructions to make the alterations to the Carriages now undergoing assimilation, and include them in the Memorandum and drawings of assimilated Carriages, and to notify the same to the Commandant of Artillery. (*See Extract from Military Board's Proceedings No. 2894, dated 16th May* 1851.)

ARTICLE 623.

ON THE MOST APPROPRIATE SCALE FOR DRAWINGS OF ORDNANCE CARRIAGES.

On determining the most appropriate Scale for the Drawings of Ordnance Carriages, &c., for circulation to Ordnance Officers and officers of Artillery referred to in the Military Board's letter (a) laid before the Committee.

(a) No. 1426, 4th March 1851.

OPINION.—The Committee prefer the scale of two inches to a foot to any other, that being the scale adopted for the Drawings of Carriages received for Record from Bengal, and of all models constructed at the Madras Artillery Depôt, its adoption in the forthcoming Drawings, therefore will, in the opinion of the Committee, facilitate comparison, and be suitable in every respect.

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ARTICLE 624.

A PROPOSITION OF CAPTAIN A. F. OAKES, DIRECTOR ARTILLERY DEPOT, THAT A 6 PDR. GUN CARRIAGE BE MADE WITH A BENGAL PATTERN TRAIL AND A SWIVEL LOOP.

Letter No. 99, *from the Brigadier Commandant of Artillery, to the Secretary to the Military Board, Fort Saint George, dated* 18*th March,* 1851.

If it be the intention of the Military Board to sanction the construction of an Experimental Carriage as alluded to by Captain Oakes, Director Artillery Depôt, I have the honor to submit his suggestions contained in the accompanying Memorandum for the Board's consideration.

Memorandum of the Director Artillery Depôt, dated 17*th March* 1851.

(a) Meeting 166, Article 592. Page 147.

As the Select Committee's recommendation [a] to construct an Experimental Carriage and Limber with reduced iron work, has been sanctioned by the Board, I beg to submit the following proposal.

2. That this Carriage be made with a Bengal pattern trail with the Madras swivel loop adapted to it of the 1850 pattern, as shewn in the drawing annexed, (Plate 35.) that the Carriage when completed be tried with one of the Limbers with the reduced projecting poles, viz., those which were altered in 1850.*

* Mily. Board's letter No. 1399, 14th Aug. 1849.

3. My reason for recommending this is, that we shall gain lightness, greater facility in wheeling, and improve the appearance of our Carriage, by bringing the Gun axle about 16 inches nearer to the limber axle.

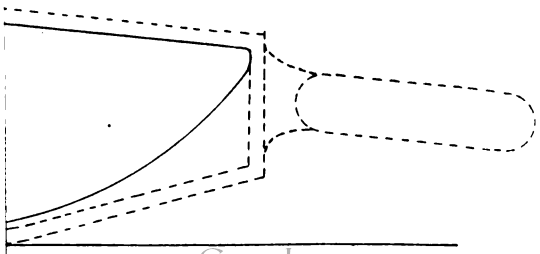
4. I would also recommend that such of the component parts of the Bengal Carriage wheels, &c. as are less than ours be adopted.

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A proposi epôt, that a 6P$^{dr}_{\div}$ Gun Carri a Swivel Loop.

The Se r Axle to Gun Axle, than uce our length by 16I$^{ns}_{\div}$

Beam Trail, with its end altered s Pattern Swivel Loop;— Black ngal Trail.— Dotted lines shews g the end for a Swivel Loop.



Madras Arty:

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C.

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MEMORANDUM.	Feet.	Ins.
From axle to axle Bengal Carriage.....	9	2½
„ „ „ Old Madras pattern (A. S. C.).....	11	1¾
„ „ „ New Carriage as now proposed.....	9	10
Difference.	1	3¾

(a) Meeting 166, Article 592. Page 147.
(b) Meeting 168, Article 608. Page 186.

OPINION.—At a former Meeting (a) the Committee recommended that a Gun Carriage and limber should be made with reduced iron work, and at their last Meeting (b) they recorded as their opinion that all beam trails of future construction of Peddowk wood should with reference to housing and length of trail be made according to the Bengal pattern; the long trail of the Madras Select Committee pattern having been adopted from necessity, owing to the Madras woods not admitting of the deep housing of the axle case given to the tough woods of Bengal: the present occasion appears to be a favorable one for constructing a carriage with the advantages of the Bengal short trail and of the Special Board and Madras Select Committee swivel loop, the Peddowk wood having been proved to be a tough and excellent wood, the Committee would suggest that Captain Oakes' proposition contained in para. 2 of his Memorandum be adopted.

MINUTE BY LIEUT. COLONEL ALCOCK.

I was not present at Meeting No. 166, when Article No. 592 was agreed to—and I never even heard of any proposal to construct the New Gun Carriage referred to, so that, when at Meeting No. 168, I consented to the conditional use of Peddowk wood (which I distrust) I had no idea whatever of entering into the views of the former Meeting for I do not think under existing circumstances that any kind of Gun Carriage should be sanctioned until the existing confusion in the Equipment of the Corps is entirely remedied.

(Signed) G. ALCOCK, Lieut. Colonel,
Artillery.

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DECISION.—Orders on this proposition deferred until a reply shall have been received from the Professor of Chemistry on a reference made to him about Peddowk and the same to be notified to the Commandant of Artillery. (*See Extract from the Military Board's Proceedings No.* 2987, *dated* 16*th May*, 1851.)

ARTICLE 625.

PROPOSED ALTERATIONS IN ASSIMILATING ORDNANCE CARRIAGES.

The Commandant of Artillery requests that the Committee will take into their consideration the following points.

1st. Whether the spare spunge staff now carried with light field pieces cannot be more conveniently packed in marching order, than in its present position which is under the right cheek, and liable to injury from the swinging of the locking chain ; the rammer heads are also too near the ground, when the gun is in action.

2nd. In the packing of the allotment of stores on Cullen's assimilated carriage, the portfire cutter, which in that pattern is on the right of the right cheek, has been found to injure the spunge staff which is carried over the right cheek ; it is suggested that the portfire cutter be removed to the right of the left cheek according to the Special Board pattern.

3rd. That 7 feet clear be allowed from splinter bar to pole bar, for all Horse Artillery poles.

4th. That the pole ends of Cullen's assimilated Carriages having too many perforations in them, it is suggested that the rear perforation for the pin should be done away with, and a band be used of the Special Board pattern, as a stop for the swivel.

* Meeting 132, Article 401. Page 447.

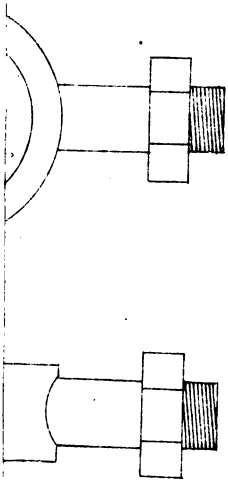
5th. That the Bengal pattern swivel established in 1846* being not so well adapted for the purpose as the old pattern, it is recommended that the old pattern be reverted to.

6th. It is proposed that rings be attached to the Horse Ar-

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Propoce. Carriages.

fig. 2.
Pattern Swivel.



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tillery linch pins to secure them, according to the present platform cart pattern of linch pin ring.

7th. That the limber pole prop-hook of Light Field Carriages be lengthened to prevent the prop from getting disengaged, which it is liable to do in rapid movements.

* No. 258, 30th June 1849. From Brigadier Comt. of Arty. to Mily. Bd.

8th. Lieutenant Colonel Conran's proposition made in June 1849* to shorten the projecting pole behind the limber by 5 Inches.

OPINION.—1st. *Spare Spunge Staff of all Light Field Pieces.* To be carried under the left cheek: one inch from the rear part of the spunge head to rest against the under part of the front of the axletree bed. The stopper for the rammer heads will be measured from the front of the axletree beds of the gun carriages of all Light Field pieces, viz. :—

		feet.	ins.	ths.
Of the 24 Pdr. Howt.	from front of axletree-bed to stopper.	4	5	9
„ 12 Pdr. How.	do. do.	4	0	0
„ 9 Pdr. Gun	do. do.	6	2	9
„ 6 Pdr. Gun	do. do.	5	5	7

2nd. *Portfire Cutter.*— That the Portfire cutter of Cullen's pattern Carriage be removed from the right of the right cheek to the right of the left cheek, so as to correspond with the special Board pattern.

3rd. *Length of Pole.*—The present established pattern pole for the Madras Artillery being 7 feet 6 inches, measured from the splinter bar to pole end, it will admit of 7 feet clear from the pole bar.

4th. *Pole End.*—The Committee prefer the present Madras Select Committee pattern, to that *proposed* by the Commandant viz., "*with a band as a stop to the swivel.*"

5th. *Swivel.*—The old pattern of swivel as shewn in the drawing Fig. 1 (Plate 36) is preferable for Horse Artillery to the Bengal pattern swivel Fig. 2, (Plate 36.)

6th. *Linch Pin Ring.*—Before altering the present pattern of linch pin in use with the Horse Artillery, the Committee

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would recommend that a special report be called for from the Commanding Officer of that Corps.

7th. *Limber prop-hook.*—The limber prop-hook to be lengthened and the opening to be reduced to 3 ths. of an inch so as just to admit a link of the chain as shewn in the drawing Fig. 3, (Plate 36.)

8th. The Committee observe by the records that this shortened projecting pole was tried with the Troop at the Mount in 1849 and highly approved of by all who were present during the experiments; it shortened the distance between the wheels of the limber and Gun Carriage and lightened the pole horses work in the turns and circles, retaining at the same time all the advantages of the old short pole; these experiments were made in the presence of several members of the Committee who were unanimous in favor of the alteration. The Committee approve of a reduction in all short poles of 5 inches, the present length of the projecting short pole is 15 inches measuring from the rear of the axletree bed to the end of the pole, not including the hook; the reduction proposed will leave 10 inches, which gives a projection beyond the rear of the limber boxes exclusive of the hook of 2 inches.

2. The Committee recommend that this alteration be included together with the whole of the above, numbered from 1 to 8 inclusive, in statement of assimilation of Gun Carriages, limbers, &c. under consideration in Article 622.

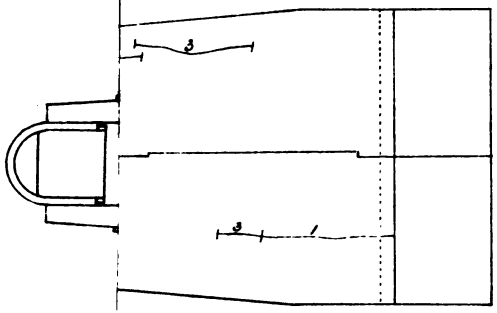
3. The reduction in thickness of the brass nave plates recommended in Article 617, and the addition of the cradle referred to in Article 621, might with advantage, if approved, be also included in the assimilation Statement of Article 622.

Decision.—That the papers be forwarded to the Superintendent Gun Carriage Manufactory, with instructions to make the alterations to the Carriages now undergoing assimilation, and include them in the Memorandum and drawings of assimilated Carriages, and to notify the same to the Commandant of Artillery. *(See Extract from Military Board's Proceedings No. 2894, dated 16th May 1851.)*

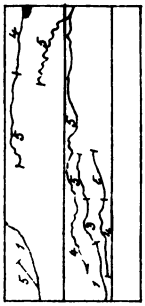
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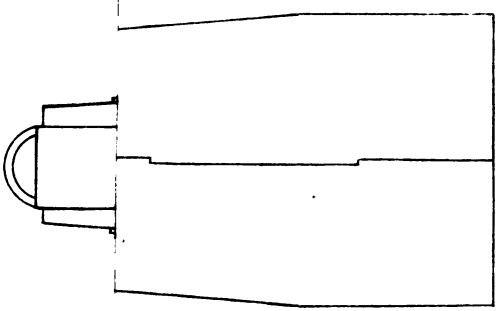
Experon Checks and Brass Naves.

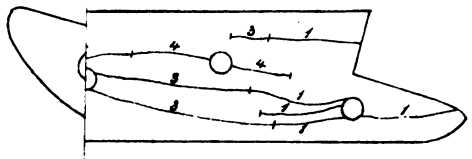
cks after the 1st Days firing.
" " " 2nd " "
" " " 3rd " "

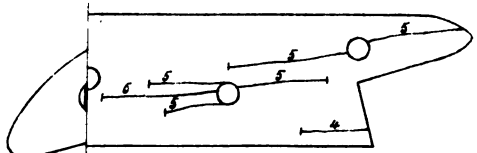


End View.









Madras feet.

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MEETING 170.

EXTRACT FROM THE PROCEEDINGS OF THE PERMANENT ARTILLERY SELECT COMMITTEE, ASSEMBLED BY ORDER OF LIEUT. COL. F. F. WHINYATES, BRIGADIER COMMANDANT OF ARTILLERY.

Present.

LIEUT. COL. H. S. FOORD, *Commanding 4th Battalion Artillery.*
MAJOR J. BACK, *4th Battalion Artillery.*
MAJOR J. W. CROGGAN, *2nd Battalion Artillery.*
CAPTAIN T. LAVIE, *Superintendent Gun Powder Manufactory.*
CAPTAIN J. MAITLAND, *Superintendent Gun Carriage Manufactory.*
CAPTAIN A. F. OAKES, *Director Artillery Depot.*
CAPTAIN B. W. BLACK, *Assistant Adjutant General of Artillery.*

ARTICLE 626.

TWO 8 INCH HOWITZER CARRIAGES OF PEDDOWK WOOD WITH IRON CHEEKS, &c.

1st. On an 8 Inch Howitzer Carriage with iron cheeks, wooden beam of Peddowk, on wooden wheels, and brass Naves.

2nd. On an 8 Inch Howitzer Carriage with iron cheeks, wooden beam of Peddowk, on iron suspension wheels, and iron naves.

The following documents are laid before the Committee.

1. *Letter from the Superintendent Gun Carriage Manufactory, to the Secretary Military Board, with a statement of the weights of the component parts of the Carriage and Limber with Iron suspension Wheels.* (a)

(a) No. 130, 22nd February 1851.

2. *Proof Report of the 8 Inch Howitzer Carriage.* (b)

(b) 3rd March 1851.

3. *Letters from the Military Board to the Brigadier Commandant of Artillery.* (c)

(c) Nos. 2690 and 2691, dated 29th April 1851.

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4. *Report of Experimental Practice with the 8 Inch Howitzer Carriage with narrow Axle at Secunderabad.* (d)

(d) Dated 29th March 1851.

5. *Copy of a letter from the Secretary to the Military Board Fort William, to the Secretary Military Board Fort Saint George.* (e)

(e) No. 1288 29th May 1851.

MEMORANDUM BY THE DIRECTOR OF THE ARTILLERY DEPOT.

The 1st Carriage with wooden Wheels was completed (a) in September 1850, and after Proof (b), which it stood uninjured, was sent to Secunderabad for experiment and report: the result his laid before the Committee.

(a) Military Board's letter No. 4852, 10th September 1850.
(b) Proof Report, dated 12th September 1850.

The 2nd Carriage with iron suspension wheels and completed (c) in February 1851, and proved (d) without being injured. The Military Board require the Select Committee to report upon the suitableness of Peddowk wood for Carriages of this Calibre; also their opinion on the iron suspension wheels.

(c) S. G. C. M. letter No. 130, 22nd Feb. 1851.
(d) Proof Report, 3rd March 1851.

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Report of Experimental Practice with the undermentioned Piece of Ordnance at Secunderabad; by order of the Officer Commanding Artillery Hyderabad Subsidiary Force.

Date.	DESCRIPTION.	No. of Carriages.	No. of Firings.	Nature and Strength of Powder.	Marks on the Ordnance.	Marks on the Carriage.	Weight of Metal. cwts.	Metal. qrs.	Metal. lbs.	Carriage. cwts.	Carriage. qrs.	Carriage. lbs.	Charge. lbs.	Charge. ozs.	Shell. lbs.	Shell. ozs.	Elevation. D	Elevation. M	Recoil. ft.	Recoil. in.	Time in Firing.	REMARKS.
10th March 1851.	8 Inch Iron Howitzer.	1	1	Very good.	1846. No. 3,833 Lowmoor.	Experimental. J. M. 1850. No. 1.	22	1	26	20	0	12	4	0	46	0	1	0	7	0		Carriage damaged the 1st round. Ditto ditto 2nd. Ditto ditto 3rd. The first round one of the transom bolts broke.
			2														2	0	8	0		The second round the handspike shoe.
			3														3	0	9	0		The third round the block trail opened at the joints in many places: on account of the carriage being damaged I deemed it advisable not to increase the elevations, the transom bolt shifting each time the Howitzer was fired.
			4														,,	,,	,,	,,		
			5														,,	,,	,,	,,		
			6														,,	,,	,,	,,		
			7														,,	,,	,,	,,		
			8														,,	,,	,,	,,		
			9														,,	,,	,,	,,		
			10														,,	,,	,,	,,		
			11														,,	,,	,,	,,		
			12														,,	,,	,,	,,		
			13														,,	,,	,,	,,		
			14														,,	,,	,,	,,		
			15														,,	,,	,,	,,		In my opinion the Carriage is more adapted for travelling over smooth ground than undulated or rocky ground; the carriage itself not being of sufficient breadth, is liable to upset from the least jolt.

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Date.	DESCRIPTION.	No. of Carriage.	No. of Firings.	Nature and Strength of Powder.	Marks on the Ordnance.	Marks on the Carriage.	Weight of Metal. cwts.	Metal. qrs.	Metal. lbs.	Carriage. cwts.	Carriage. qrs.	Carriage. lbs.	Charge. lbs.	Charge. ozs.	Shell. lbs.	Shell. ozs.	Elevation. D	Elevation. M	Recoil. ft.	Recoil. in	Time in Firing.	REMARKS.
15th March 1851.	8 Inch Iron Howitzer.	1	1	Very good.	1846. No. 3,833 Lowmoor.	Experimental. J. M. 1850. No. 1.	22	1	26	20	0	12	4	0	46	0	1	0	7	0		The Carriage stood the first five rounds pretty well, but the sixth round the Carriage became damaged as on the last morning.
			2														"		"			
			3														"		"			
			4														"		"			
			5														"		"			
			6														6		13	0		
			7																			Carriage damaged exactly as on the morning of the 10th Instant, with the exception that the handspike shoe remained firm.
			8														"		"			
			9														"		"			
			10														"		"			
			11														"		"			
			12														"		"			
			13														12	0	30	0		Carriage further damaged. The ends or projections of the trail near the axletree split in many places. With 12° elevation the average was about 3,600 yards, the Howitzer remarkably true. The above elevation was only obtainable by depressing the trail.
			14														0	0	0	0		
			15														0	0	0	0		(Signed) H. G. Bishop, Lieut. *Superintending Officer.*
20th March 1851.	8 Inch Iron Howitzer.	1	1	Very good.	1846. No. 3,833 Lowmoor.	Experimental. J. M. 1850. No. 1.	22	1	26	20	0	12	4	0	46	0	1	0	15	6		After the first round the left transom bolt and the trail cracked on both sides. The splits at the end of the trail mentioned by Lieutenant Bishop increased very much before the 15 rounds were fired and the carriage altogether appeared to be very much shaken when fired at the greatest elevation that could be given, viz. 9½ degrees. (Signed) J. R. Magrath, Lieut. *Superintending Officer.*
			2														1	15	15	0		
			3														2	15	15	0		
			4														3	15	15	0		
			5														4	15	15	0		
			6														4	0	12	0		
			7														4	0	13	0		
			8														4	0	15	0		
			9														4	0	15	0		
			10														9	0	12	0		
			11														9	0	12	0		
			12														9	30	12	0		
			13														9	30	12	0		
			14																			
			15																			

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REMARKS.—We marched with the 8 Inch Howitzer from the Arsenal at ¼ to 6 A. M. with a team of 18 Bullocks in draught, four pairs being yoked in four abreast and one pair leading.

The first rough ground to which we came was over a half finished road, leading about N. N. E. from the Artillery Lines. This road undulates considerably; it is intersected in one place by a nullah (of about 3 feet in depth, and of the same width) with rather steep banks, and is in parts completely covered with large masses of stone varying in height from half a foot to 16 inches. There is a hill to the Eastward of this track (between it and the main road to Bolarum) and on the summit and sides of which are huge blocks of stone; over the shoulder of this hill, I determined to take the "Experimental Carriage," as I imagined that the strength of the materials would be sufficiently tested by the passage over it as also the liability (or otherwise) of the carriage to upset, the axletree of which appeared to me to be much too narrow, considering the height of such a great mass of metal (22½ cwt.) from the ground; accordingly, the carriage was first well jolted at a walk over the smaller stones on the road way, and was then taken across the nullah at an angle of about 65° by which it was very nearly upset. The shoulder of the hill above-mentioned had a slope at its base of about 12° or 9°, but the large blocks of stone made the path to be travelled over very uneven. We now turned "half right" to take the ascent in a slanting direction but as the bullocks were thus made to face the hill they stopped *unanimously* before they had proceeded eight yards, and as neither persuasion nor force would move them, I was obliged to have recourse to the dragropes: after much tugging and hauling at one place, we righted it by fastening a rope to the felloe of the lower wheel and passing over that of the upper one, and we then proceeded along some comparatively smooth ground, over a portion of which we trotted, as I was unable to succeed in my intention of taking the Howitzer over the shoulder of the hill, shortly afterwards we cros-

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sed the Bolarum road (near the Camel sheds) and passed through some heavy sand with a paddy field upon our left. I resolved to cross this field, and accordingly took the Howitzer down the side of the Bund, which had a very *gentle slope*. In descending it, however, the Carriage upset, (as I had anticipated) and broke the right limbering handle in turning over. The limber also was very nearly capsized, the great weight of the Howitzer and the angle at which it acted, forcing the limber over until it rested on one wheel only, the other being nearly a foot off the ground. As there were only six Europeans with me, I thought we should not have been able to right the Carriage, which I had unlimbered after the upset, in order to take the heavy strain off the limber, but Karkhana Serjeant Rogers of the B Company proposed to bring the limber close up to the wheels at right angles to the carriage, so that the bullocks might be made available. The rope was fastened in the same manner as when the limber had capsized and the ends were fastened to the limber axle (a turn being taken) " en passant" round the button and neck of the muzzle to prevent disadjustment, and the bullocks by this means pulled the carriage upright, without great effort, they being halted in time to prevent its turning a complete somerset. We then returned home.

SECUNDERABAD,
8th March, 1851.

(Signed) A. STEWART, Lieut.
Superintending Officer.

(True Copy.)

(Signed) P. HAMOND, Lieut. Col.
Comg. Arty. H. S. Force.

MEMORANDUM REGARDING THE EXPERIMENTAL 8 INCH HOWITZER CARRIAGE.

On the carriage being first issued from the Arsenal, a few slight cracks appeared, but of no width or depth and appa-

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rently of no importance, further than showing a likelihood that they would increase on the carriage being subjected to proof and these cracks have since increased to a great extent, so much so, that on examination after the 3rd days firing, it is evident that the carriage is unfit for further use. The crack numbered 5 (on the accompanying plan*) commencing near the trail plate on the left side of the trail and extending nearly ⅔ of its length, would, in my opinion, from its depth and width be alone sufficient to condemn the carriage, but the other cracks as shown on the plan, especially those marked on the end view are of so dangerous a nature as to leave no doubt as to the carriage being unfit for service.

The wheels of the carriage appear perfect in every respect.

The Iron work of this carriage has, during the short trial, repeatedly broken and cracked, especially the bolts, neither does the elevating screw appear to be sufficiently strong, various cracks appear on it, and it has also become bent. The iron cheeks stood well, with the exception of one trunnion plate, the shoulder of which appears cracked.

On each morning after being sent into the Arsenal, for examination, the piece was dismounted and the iron cheeks removed.

Arsenal H. S. Force,
Secunderabad,
29th March, 1851.

(Signed) J. L. Barrow, Bt. Capt.
Commissary of Ordnance.

Opinion.— Neither of these carriages appear to have been constructed with the view to their being used as travelling carriages with their ordnance ;—the shortness of their axles gives great strength for firing purposes, but as the upper part of the piece from the ground measures 10 inches more than the distance of the base, (between outside of wheel tires) they cannot be looked upon as safe travelling carriages ; with regard to the suitableness of Peddowk wood for carriages of this

(* Plate 37.)

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calibre, the Committee would wish to defer their report, until after the carriage new at Secunderabad shall have been inspected by them in its present state; for which purpose, they recommend its being sent to Artillery Head Quarters without its ordnance.

2. The iron suspension wheels might be tried on the wheel testing road at the Mount, with a weight equal to that of the 8 Inch Howitzer and its carriage being placed on the wheel testing beam, if it be intended to introduce these wheels experimentally to travelling carriages of Heavy Field Ordnance.

The above Experiments authorized, *(see Military Board's letter to the Brigadier Commandant af Artillery, No.* 5087, *dated 28th August* 1851,*)* and subsequently deferred until after the arrival of a Troop of Horse Artillery at Head Quarters, *(see Military Board's letter No.* 6515, *to the Brigadier Commandant of Artillery, dated 7th November* 1851*)*.

ARTICLE 627.

12 Pounder Howitzer Experimental Waggon built of Teak Wood of reduced Dimensions.

(a) No. 2625, 3d May 1851.

The Military Board call [a] for the report of the Artillery Select Committee on a 12 Pdr. Howitzer Experimental Waggon built of Teak wood of reduced dimensions in wood and iron work.

The following Documents are laid before the Committee.

1. *Letter from Superintendent Gun Carriage Manufactory, to the Secretary Military Board.* [b]

(b) No. 201, 27th March 1851.

(c) No. 286, 29th April 1851.

2. *Letter from do. to do.* [c]

3. *Statement of the weights, &c. of the component parts of the* 12 *Pdr. Howitzer Waggon.* [d]

(d) 27th March 1851.

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OPINION.—By the following Table showing the difference in the weight of the several waggon bodies now in use,

Special Board not assimilated.	Body	8-2-26	Total	13-2-21
	Wheels	4-3-23		
G. O. G. assimilated.	Body	9-0-2	Total	13-3-5
	Wheels	4-3-3		
A. S. C. Pattern.	Body	9-1-4	Total	14-0-20
	Wheels	4-3-16		
Waggon body of reduced dimensions now under report.	Body	7-0-8	Total	11-0 16
	Wheels	4-0-8		

the Committee are inclined to approve of the Waggon Body built of Teak Wood, of reduced dimensions in wood and iron work, it being upwards of 3 cwt. lighter than that of the A. S. Committee pattern, and between 2 and 3 cwt. lighter than the Special Board and G. O. G. of 1842 assimilated patterns.

2. The Superintendent informs the Committee that he can prepare a Limber made of Teak, similarly reduced by the end of this month, and as so favorable an opportunity may not be again presented for practical experiments, viz., the occasion of the relief of the A and C Troops of Horse Artillery, they recommend that a Limber be constructed at once for this waggon body, and that the waggon be marched up to Jaulnah fully equipped for service with the A Troop, and back to the Mount with the C Troop, when the Committee would wish again to inspect it, and make their final report.

3. The Committee further recommend that the following Peddowk wood carriage and waggon of reduced dimensions should undergo the same ordeal.

Carriage and Limber (reduced dimensions Peddowk) 12 Pdr. Howr.	1
Waggon requiring a Limber (reduced dimensions Peddowk) 12 Pdr. Howr.	1

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4. Should the Board approve of this proposal, it will be necessary to order one Teak wood, and one Peddowk wood Limber (of reduced dimensions in iron and wood work) being immediately constructed.

1ST DECISION.—The two Limbers recommended to be made up in the 4th para. of Article 627 Sanctioned, *(See Military Board's letter No.* 5083, *to the Brigadier Commandant of Artillery, dated* 28*th August* 1851.*)*

2ND DECISION.—The Military Board grants authority for the one 12 Pdr. Howitzer carriage and the two 12 pdr. Howitzer waggons, being subjected to test, by a march to Jaulnah with the A Troop, and a march back to Madras with the C Troop, *(See Military Board's letter No.* 5135, *to the Brigadier Commandant of Artillery, dated* 28*th August* 1851.*)*

ARTICLE 628.

STANDARD WEIGHT OF ASSIMILATED LIGHT FIELD CARRIAGES AND LIMBERS.

(a) No. 2656, 6th May 1851.

The Military Board *(a)* call for a report as to what may be considered the standard weight of assimilated Light Field Carriages and Limbers.

The following Documents are laid before the Committee.

(b) No. 2656, 6th May 1851.
(c) No. 3586, 20th June 1851.

1. *Letter from the Secretary Military Board to the Brigadier Commandant of Artillery.(b)*

2. *Letter fron Do. to Do. (c)* together with Statements containing in detail the weights of the component parts of all the patterns of carriages now in use, including those constructed from 1826 to 1850, from which the Committee have drawn up the following table.

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Average of Weights of the several Component parts of Gun Carriages, Limbers, Waggons, &c. of all Patterns constructed from 1826 *to* 1849 *inclusive.*

Pattern.	Wheels.		Bodies of Gun Limbers.		Bodies of Waggons.		Bodies of Waggon Limbers.		Wheels of Gun Limbers.		Wheels of Waggons.		Wheels of Waggon Limbers.	
	Average of.	Weight.	Average of.	Weight.	Average of.	Weight.	Average of.	Weight.	Average of.	Weight.	Average of.	Weight.	Average of.	Weight.
	No.	lbs.	No.	lbs.	No.	lbs.	No.	lbs.	No.	lbs.	No.	lbs.	No.	lbs.
Block Trail ...	4	488¾	4	716¼	—	—	—	—	4	493¼	—	—	—	—
Col. Cullen's...	22	512⅛	22	721	9	823⅓	9	710⅓	22	502		492	9	498
Special Board..	14	541	14	791⅛	—	—	—	—	14	545½	—	—	—	—
G. O. G. 1842..	4	551	4	713⅛	—	—	—	—	4	551¼	—	—	—	—
A. S. Committee	25	562	25	775½	36	63½	36	775	25	552	36	560	36	560

Weights of Bodies of Carriages.

Pattern.	Average of.											
	2-6 Pdrs.	4 ,,	5 ,,	11 ,,	4-9 Pdrs.	7 ,,	8 ,,	10 ,,	3-12 Pdrs.	4 ,,	4-24 Pdrs.	7 ,,
	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
Block Trail. ...	—	731¼	—	—	—	—	—	—	—	—	—	—
Col. Cullens....	—	—	—	686	—	779	—	—	—	777	—	—
Special Board..	799⅛	—	—	—	—	—	824	—	—	—	985	—
G. O. G. 1842...	—	—	—	—	831	—	—	—	—	—	—	—
A. S. Committee.	—	—	793	—	—	—	—	957	853	—	—	976

Opinion.—No standard weight can possibly be fixed applicable to all the different patterns; assimilation to the pre-

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sent Artillery Select Committee pattern cannot materially affect the weight of the several Carriages above given, as will be seen by the following Table, shewing the weight of each of those Carriages *after* assimilation, which may be taken as the standard, giving as they do, the actual weight of the Carriages of the different assimilated patterns now in the Field Train.

Weights of the Carriages of the different assimilated Patterns now in the Field Train.

Pattern.	Bodies of Carriages.				Wheels.
	24 Pdr. Howr.	12 Pdr. Howr.	9 Pdr. Gun.	6 Pdr. Gun.	
	lbs.	lbs.	lbs.	lbs.	lbs.
Block Trail.	——	——	——	755	492
Col. Cullen's	——	——	788	676	510
Special Board.....	978	914	783	798	532
G. O. G. 1842.....	——	——	832	792	552
A. S. Committee....	852	934	898	730	559

2. The Committee are of opinion and the Superintendent of the Gun Carriage Manufactory concurs, that the Bengal pattern of housing, also their length of trail, might experimentally be adopted with advantage, combining them with the Madras Select Committee pattern in other respects, according to their recommendation,* when reporting upon a Peddowk wood Carriage on the 4th April last.

* Meeting 168, Article 608

Decision.—The question of housing the trails is now under consideration and when decided on, the subject of the weights of Carriages will again be resumed *(See Military Board's letter No.* 5082, *to the Brigadier Commandant of Artillery, dated 28th August* 1851.*)*

ARTICLE 629.

Pouches to contain Blank Cartridges for Priming Ordnance.

The Military Board call (a) for the opinion of the Select Committee on pattern Pouches

(a) No. 1698, 19th March 1851.

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to contain blank cartridges for priming Ordnance, the experiments which have been made, having been considered satisfactory.

Before recommending the adoption of the Pouch for priming cartridges of the pattern submitted by the principal Commissary of Ordnance, the Committee request that a Pouch of the Bombay pattern may be submitted for their inspection, with a statement giving the following information.

How many Pouches are allotted to each sub-division in Bombay?

Where are they carried?

How are the spare cartridges for refilling the Pouches packed, and where are they carried?

ARTICLE 630.

Experiments with Spherical Case Shot Filled with Lead and Sand.

The Military Board direct* that the Report of Experiments with Spherical Case Shot filled with lead and sand, recommended to be carried on by the Select Committee, (a) be submitted to them for their consideration.

* No. 4252, 19th July 1851.

(a) Meeting 168, Article 616.

This experiment was carried on with a 9 pounder to ascertain—

1st. Whether or not a shot would deflect to the right of the centre of gravity when the latter is placed to the right of the axis of the bore, and vice versâ.

2d. Whether or not the centre of gravity placed above the axis would give a greater range than when below, and vice versâ.

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Experiments with a 9 Pdr. Gun, to ascertain whether or not a shot would c
bore, or vice versâ. The shot used were 9 Pdr. spherical case, prepared b
and filling up the remainder next the fuze hole with lead. The Gun was la
gun with the fuze hole to the right or left of the bore of the piece as shown
perfectly level platform, and was run up to the same spot on each occasion o

Date.	No. of Rounds.	Charge.		Elevation.		Weight of Shell Empty.		Weight of Sand in each Shell.		Weight of Lead in each Shell.		Total Weight.		Lead placed to the
		lbs.	ozs.	D.	M.	lbs.	ozs.	lbs.	ozs.	lbs.	ozs.	lbs.	ozs.	
28th June 1851.	1 2 3 4 5 6 7 8 9 10 11 12	2	4	1	15	4	11	0 or ⅛ the Shell filled.	8	3 or ⅛ the Shell filled.	2	8	5	Ri L Ri L
4th July 1851.	1 2 3 4 5 6 7 8	2	4	1	15	4	11	0 or ⅛ the Shell filled.	8	3 or ⅛ the Shell filled.	2	8	5	Ri Le Rig Le Rig Le Rig Le
4th July 1851.	1 2 3 4	2	4	1	15	4	11	0 or ⅛ the Shell filled.	8	3 or ⅛ the Shell filled.	2	8	5	up dow up dow
28th June 1851.	1 2 3 4 5 6 7 8 9 10 11 12	2	4	1	15	4	11	0 or ¾ the Shell filled.	12	1 or ¼ the Shell filled.	7	6	14	Rig Le Rig Le Rig Le Rig Le Rig Le Rig Le
4th July 1851.	1 2 3 4 5 6 7 8	2	4	1	15	4	11	0 or ¾ the Shell filled.	12	1 or ¼ the Shell filled.	7	6	14	Rig Le Rig Le Rig Le Rig Le
4th July 1851.	1 2 3 4	2	4	1	15	4	11	0 or ¾ the Shell filled	12	1 or ¼ the Shell filled	7	6	14	up down up down

ARTILLERY, DEPOT, St. Thomas' Mount, 8th July, 1851.

(Signed) F. F. WHINYATES, Comm

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...he right of the centre of gravity, when placed to the right of the axis of the ...uring sufficient sand in the shell to fill one half or three-fourths of the cavity ... Flag-Staff each round at 809 yards distance, and the shot was placed in the ... The shell filled with sand holds about 1 lb. The Carriage was placed on a

Range. Line.	Range. Left of Line.	Distance.	Recoil.		REMARKS.
...rds.	Yards.	Yards.	ft.	ins.	
...½	0	680	9	0	
...	0	703	9	4	In this experiment half of the shell's cavity was filled with lead, 12 shots were fired, the ranges of 11 shots were taken, one shot was not marked—6 of the shots were made with the centre of gravity of the shot placed to the right of the axis of the bore—4 only of the 6 carried to the right, and 2 carried to the left, all of the 5 shots with the centre of gravity of the shot placed to the left of the axis of the bore, carried to the left, giving 9 to 2 in favor of the correctness of the Belgium experiments referred to in Madras Artillery Records "Miscellaneous." Page 728.
...	5	770	9	9	
...	10	896	9	9	
...	0	807	9	6	
...	0	756	9	6	
...	10	815	9	0	
...	3½	756	9	6	
...	11	847	9	6	
not known.			9	6	
...	11	853	9	6	
...	10	860	9	6	
13	0	675	8	0	
0	3	1035	9	0	
0	3	730	8	6	Shells filled as above—3 out of the 4 shots with the centre of gravity placed to the right, carried to the right, and one to the left. The whole 4 shots placed with the centre of gravity to the left carried to the left.
4	2	890	8	0	
0	0	802	8	0	
0	11	850	8	0	
2½		729	8	0	
	4	870	8	0	
19	0	902	7	6	Two shells were placed with the centre of gravity next the upper surface of the bore, their ranges were 902 and 990 yards, and two with the centre of gravity next the lower surface of the bore, the ranges were 806 and 750 yards.
0	3	806	8	0	
9	0	990	8	0	
5	0	750	8	0	
20	8	774	9	0	
...	0	692	9	0	
...	0	767	8	6	
...	9	763	9	0	In this Experiment ¾ of the shell's cavity was filled with lead, 12 shots were taken and first grazes marked—10 were in favor of, and 2 against the Belgium maxim.
...	0	816	8	9	
1½	0	734	8	0	In the 23 ranges taken in this morning's experiment, the first 11 shots gave 4½ to 1, and the 12 last shots 5 to 1 in favor of the Belgium maxim.
...	0	860	9	0	
...	6	755	9	0	
...	0	1165	8	6	
...	12	850	8	0	
...	0	684	8	0	
...	7	729	8	0	
...	0	725	7	6	
...	4	720	7	0	Shells filled as above—Four shots with the centre of gravity placed to the right carried to the right, and the four that were placed to the left carried to the left. Two were placed with the centre of gravity next the upper surface of the bore, their ranges were upwards of 2,000 yards, and two with the centre of gravity next the lower surface of the bore, the ranges 705 and 700 yards respectively.
...	0	710	7	0	
...	12	885	7	0	
...	0	740	7	0	
...	12	885	6	9	
...	0	740	7	0	
...	48	1380	7	0	
...er the tope.		0	7	0	The Shells with ¼ of the cavity filled with lead gave by far a greater variation of range when placed towards the upper and lower surface of the bore, than those with their cavities half filled.
0	6½	705	7	0	
...er the tope line.		0	7	0	
		700	7	0	

...dier,
... of Artillery.

(Signed) A. F. Oakes, Captain,
Director Artillery Depôt.

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OPINION.—The Committee consider the result of this experiment to be fully corroborative of the correctness of those made in Belgium,* and which were published in the Artillery Records under the head "Miscellaneous" Page 728.

* In 1835 and 1840.

† Meeting 168, Article 616.

2. Adverting to the former Proceedings† of the 4th of April 1851, and to Major Anstruther's proposition, viz. "that all round shot be floated in quicksilver to ascertain where the centre of gravity was *not*," &c., excepting with a view to carrying on minute experiments, for some special purpose, they cannot recommend its adoption, for the reasons already given in their proceedings above quoted.

The above subject recorded in the Military Board's Proceedings *(See their letter No.* 5098, *to the Brigadier Commandant of Artillery, dated 29th August* 1851.*)*

ARTICLE 631.

IRON HOOPS FOR THE SLIDING BLOCKS OF 8 INCH AND 56 POUNDER GARRISON CARRIAGES.

On the advantage or otherwise of furnishing the ends of the front and rear sliding blocks of the 8 Inch and 56 Pounder Garrison Carriages, with iron hoops to prevent their splitting from the effects of the weather when exposed.

The following Documents are laid before the Committee.

(a) No. 455, 21st July 1851.

1. *Letter from the Superintendent Gun Carriage Manufactory to the Secretary Military Board.(a)*

(b) No. 4638, 7th August 1851.

2. *Letter from the Secretary Military Board to the Brigadier Commandant of Artillery.(b)*

OPINION.—The Committee approve of the adoption of Iron hoops to the ends of the front and rear sliding blocks of the 8 inch and 56 Pounder Garrison Carriages, and further recommend, that Iron hoops be applied to the rear ends of the sides or brackets of the Carriages, and to the ends of the centre and rear transoms of the Dwarf wooden traversing Platform for these Carriages.

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MEETING 171.

EXTRACT FROM THE PROCEEDINGS OF THE PERMANENT ARTILLERY SELECT COMMITTEE, ASSEMBLED BY ORDER OF LIEUT. COL. F. F. WHINYATES, BRIGADIER COMMANDANT OF ARTILLERY.

Artillery Depôt, Saint Thomas' Mount, 17th September, 1851.

Present.

LIEUT. COL. F. BLUNDELL, C. B. *Principal Commissary of Ordnance.*
LIEUT. COL. H. S. FOORD, *Commanding 4th Battalion Artillery.*
LIEUT. COL. G. ALCOCK, *Commanding 2nd Battalion Artillery.*
MAJOR P. J. BEGBIE, *Commanding 5th Battalion Artillery.*
CAPTAIN T. LAVIE, *Superintendent Gunpowder Manufactory.*
CAPTAIN J. MAITLAND, *Superintendent Gun Carriage Manufactory.*
CAPTAIN A. F. OAKES, *Director Artillery Depôt.*
CAPTAIN B. W. BLACK, *Assistant Adjutant General of Artillery.*

ARTICLE 632.

MOUNTAIN TRAIN EQUIPMENT.

Captain Oakes' Mountain Train Equipment consisting of the following pieces on wrought iron carriages and beds, having been completed, are again submitted to the Committee in accordance with their former Proceedings.*

* Meeting 161 Articles 573, 574 Pages 49-55 Artillery Records Meeting 167 Article 599 } Page 161

5½ Inch Brass Mortar.
4⅘ Inch Brass Howitzer.
3 Pdr. Brass Gun.

Every information connected with these Carriages with

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their equipments, &c., is given in the following Memoranda of the Director Artillery Depôt, dated 1st August and 1st September, 1851.

Memorandum of the Director Artillery Depot, dated 1st August 1851.

In accordance with the resolution of the Artillery Select Committee at their Meeting on the 3rd of February 1851,* I beg to state that I have completed the Mountain Train Equipment and have concluded the Experiments hereafter explained.

* Meeting 167, Article 599, Arty. Records, Page 161.

2. The alterations which have been made in these pieces since I first submitted them,* are the following:—

* Meeting 161 Articles { 573 / 574 } Pages 49-55.

5½ Inch Mortar Carriage.

Axletree—The mode of fixing it into the cheeks strengthened.

Elevating Screw Box—Metal thickened ¼ inch.

„ *Screw*—Lengthened ½ an inch.

Semelle—Shortened 1 inch.

Wheels—Edges of spokes rounded.

5½ Inch Mortar Carriage Cart.

Mode of Suspending the Carriage.—The ropes on axletree of Cart removed, and two iron bands with hinges, loops, and hooks, substituted. The frame of cart shortened 4½ inches in rear, the lashing bar for supporting the trail of carriage removed, and a fixed iron band with suspending hook and key substituted.

Frame of Cart—Strengthened by an iron plate underneath.

Shafts—Chains and breeching hooks attached and strengthened by iron plates.

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Small Store Box, secured by hasps and keys.

Ammunition Boxes, lashings removed and hasps and keys substituted.

Copper Boxes, altered to the A. S. Committee Pattern.

Cheeks, for retaining the Carriage wheels fixed on cart.

Linstock, carried inside of frame and secured by a loop and strap.

Handspikes, one carried on each side of frame secured by loops and straps, each handspike having an iron bearer attached for mounting and dismounting the carriage.

Spunge, carried on the frame, secured by a loop and strap.

Pole, adapted so as to bring the yoke the proper height for the ordinary sized bullock.

Slow Match Box, fixed on frame of cart.

Ammunition Cart.

Frame, reduced 17 inches in length to carry six ammunition boxes instead of eight, a keg added in rear for tar and grease.

Ammunition Boxes, lashing removed, and hasps and keys substituted.

Shafts, staples, chains, and breeching hooks attached.

Pole, the same as in the carriage cart.

4⅕ Inch Howitzer Iron Carriage.

Iron Loops, placed in front of cheeks for carrying.

4⅕ Inch Howitzer Carriage Cart.

Frame work, adapted to carry the iron carriage with its metal.

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3 Pounder Gun Carriage.

A new axletree, $2\frac{3}{4}$ inches square instead of $2\frac{1}{2}$.

Axle arms, proportionally increased, viz. :

Large end Diameter,	Small end Diameter.
from 2 to 2·4 ins.	from 1·8 to 2·12 ins.

Length from shoulder to shoulder altered from $12\frac{1}{2}$ to 21 inches.

Shafts, made to fix in a socket and move on a swivel.

Limbering handles, attached.

Experiments with Mountain Train.

3. The experiments made in draught have been confined principally to testing a single pony in shafts with the $5\frac{1}{2}$ and $4\frac{2}{5}$ inch carriage carts, and the $5\frac{1}{2}$ $4\frac{2}{5}$ and 3 Pdr. Ammunition Carts; the pony was a Pegue standing $12\frac{1}{2}$ hands high, he has drawn the whole of the above Carts with ease over every description of ground; the steepest ascent made has been up a hill of 100 yards in length with a slope of 1 foot in 7, (according to Aide Memoire 1 in 4 is inaccessible for wheel carriages). As the pony has drawn all these carts with ease fully equipped for service, I have not thought it necessary to make any lengthened experiments with bullocks, beyond adapting the bend of the pole to suit bullocks of the ordinary size.

Two bullocks are sufficient for each of the carts, and one bullock for the 3 Pdr. gun in a single yoke.

Memorandum of the Director Artillery Depôt, dated 1st September 1851—Is given in the following description of the Mountain Train and its equipment paged, from No. 1, to 15.

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OPINION.—The Select Committee having in a former Meeting* decided upon the Ordnance that is to form the Mountain Train, viz.: the 5½ inch Mortar; 4⅘ inch howitzer and 3 pounder gun, have now before them the carriages, beds, equipments and drill, as proposed by Captain A. F. Oakes, Director of the Artillery Depôt, these they consider in every respect complete, and well suited for general service, subject to such modifications from time to time, as may be found necessary after each piece shall have been brought into use.

* Meeting 161, Article 574, 26th June 1850.

MINUTE BY MAJOR BEGBIE.

Whilst giving all due credit to Captain Oakes, for the labor and ability displayed in fitting up these various pieces of Ordnance for the Mountain Train, I must express my opinion that the weight of the shafts on the back, amounting to 70 lbs. is too much for a pony to bear for a continuance of long marches in mountain passes; although I cannot suggest any improvement in the construction. It is, however, a piece (with reference to calibre) that I should never take by choice on any service whatever.

ST. THOMAS' MOUNT, 18*th September*, 1851. } (Signed) P. J. BEGBIE, Major, *Artillery.*

MINUTE BY CAPTAIN MAITLAND, SUPERINTENDENT GUN CARRIAGE MANUFACTORY.

In one of the subjects brought before the Artillery Select Committee at our last Meeting,* are comprised three entirely new and different patterns of Carriages for a Mortar, a Howitzer, and a Gun, with carts of new patterns to carry each fully equipped, and carts for ammunition also of new patterns to be attached to those pieces.

* Meeting 161, Article 574.

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This extensive equipment has been passed without even the usual extraordinary proof which has taken place on all former occasions when introducing a new carriage into the service; the reports laid before the Committee only show that they have stood the ordinary proof; I am, therefore, not satisfied that any of the three carriages are strong enough, and I have still greater doubts that the principles of construction of the Mortar and Gun carriages are suitable; with these impressions, I beg leave to place on record my dissent from the opinion of my colleagues.

(Signed) J. MAITLAND, Captain,
Supt. Gun Carr. Manufactory.

GUN CARRIAGE MANUFACTORY,
MADRAS, 18*th September*, 1851.

MINUTE BY CAPTAIN A. F. OAKES, DIRECTOR ARTILLERY DEPOT, DATED 19TH SEPTEMBER, 1851.

The Artillery Select Committee in Article 632, of this Meeting, have recommended three wrought Iron Carriages for Mountain Train Service, the invention of the Director Artillery Depôt, they having undergone the usual proof, uninjured. In Article 633, two Iron Mortar beds of a new pattern for $5\frac{1}{2}$ and $4\frac{2}{5}$ Inch Mortars, which had also undergone the usual proof uninjured, were in like manner, on the same day, recommended by the Select Committee for general service.

(a) Appended to Article 632.

2. The Superintendent of the Gun Carriage Manufactory has recorded in his Minute (a) of the 18th Instant, that three Mountain Train Carriages, not having undergone an Extraordinary Proof, he is "not satisfied that any of the three carriages are strong enough" and he has "still greater doubts that the principles of construction are suitable;" but the $5\frac{1}{2}$ Inch and the $4\frac{2}{5}$ Inch Beds, neither of which have undergone an extraordinary Proof, submitted at the same Meeting, are considered by the Superinten-

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dent as fit at once to be passed for General Service ; the latter beds, be it observed, are modifications by the Superintendent of a pattern of Major Anstruther's which *failed* in Proof on the 14th June 1850, on which occasion the Committee recorded (b) the following *in favor* of one of the very carriages on whose principle of construction the Superintendent has "*greater doubts.*"

(b) Meeting 161, Article 573, Arty. Record's A. S. C. Procgs. Page 49.

2. "The three carriages have now been before the Committee at Proof, and they consider that Captain Oakes' has "shown satisfactory results, and is suited for general purposes, "as well as for transport on Mountain Service."

3. "The carriages of Major Anstruther and Captain Maitland have failed in Proof, owing, the Committee consider, "to their dimensions being reduced too much."

3. If an extraordinary Proof were necessary at all, (which I cannot admit) one would suppose that the Bed, the pattern of which failed on the occasion I have above alluded to, and has now been modified by the Superintendent, would have been recommended for that ordeal? particularly as the Mountain Train Carriages, besides Proof, have undergone the following firings :—and the pattern of Cart, the experiments shown in para. 13.

The 3 Pdr. Carriage was in Battery during 5 days of the Annual Artillery Practice of 1851, and 24 rounds fired from it.

The 4⅘ was in Battery during 15 days of the Annual Artillery Practice of 1851, and 75 rounds fired from it.

Besides the above, the following No. of rounds have been fired from these pieces at a Practice under the Director Artillery Depôt.

5⅘	Inch Mortar.....	9 Rounds.
4⅘	Inch Howitzer.....	18 „
3	Pdr. Gun.....	9 „

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4. The Superintendent seems to think an extraordinary Proof as a "*usual*" test for new Carriages—the only cases that I can find on record are the occasions* of trying very untrustworthy woods—Ooroo-poo and Peddowk, undoubtedly, before such woods could be admitted into the Service, an extraordinary Proof was called for—I have no fear of my carriages standing an extraordinary Proof; on the contrary; but I think it would be unwise to test them beyond the ordinary Proof; the last carriage introduced into the Madras Artillery; viz.; the Select Committee pattern did not undergo an extraordinary Proof, and the Royal and Indian Artilleries have hitherto as a General rule, been satisfied to receive carriages which pass the proof laid down.

* Meeting 146, Article 484, Meeting 162, Article 580, Arty. Records. A. S. C. Proceedings. Pages. { 401 / 82

5. For the information of those officers who were not part of our Committee in December 1849, when the subject of Mountain Train Carriages was first introduced, I beg to submit the following Epitome of all that has taken place.

6. On the 7th December 1849,* the subject of the best description of Carriages for the 3 Pdr. 4⅘ Inch Howitzer and 5½ Inch Mortar, preparatory to considering the means of moving them on service, was first mooted, on which occasion the Committee decided that one of each of the 5½ Inch Mortar Beds as proposed by Captain (Bt. Major) Anstruther, C. B. Captain Maitland and Captain Oakes, should be constructed.

* Meeting158, Article 542, Arty. Records A.S.C. Proegs. Page 1005.

7. On the 20th February 1850,* the subject was again brought before the Committee, whose decision was, that the three carriages should undergo such alterations and modifications, as the Officers who submitted them might desire, which was approved of by the Military Board in their letter* dated 15th March 1850.

* Meeting 159, Article 551, Artillery Records, A. S. C. Proceedings, Page 6.

* No. 1062.

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8. On the 3d May 1850,* the Committee suggested to the Military Board their being allowed to prepare plans of suitable patterns of Iron Carriages for Mountain Train purposes, which was sanctioned by the Board in their letter* dated 11th May 1850.

* Meeting 160, Article 564, Artillery Records, S. C. Proceedings, Page 36.

* No. 2677.

9. At a subsequent Meeting,* plans of the 3 Pdr. and 4⅘ Inch Howitzers iron carriages now in question, were laid before the Committee, the principles of construction of both the carriages were at the time most fully detailed in my Memoranda, dated 19th June 1850, and were published in Artillery Records, Pages 57 and 59 of Artillery Select Committee Proceedings. In the construction of these two carriages, there has not been the slightest deviation from the original principles laid down by me, and yet after a period of 15 months, the Superintendent of the Gun Carriage Manufactory has "*great doubts*" as to my principles of construction.

* Meeting 161, Articles 574, Artillery Records, S. C. Proceedings, Page 55.

10. I submit the following contrast of my 3 Pdr. with that of the established patterns, and my 4⅘ Inch Howitzer carriages, with a carriage of the same calibre, constructed by the Superintendent, according to his own principles in 1842.

11. My 3 Pdr. carriage with its shafts weighs less than ⅓ of the present Madras pattern, the former is moved easily in draught by one pony, or one bullock ; and the whole can be carried, by eight men. The allotment of cattle for a 3 Pdr. of the Established Pattern is 6 bullocks !

12. My 4⅘ Inch Howitzer Iron carriage weighs Cwts. 2, 0, 0,* the one now in use, also made of iron of the Superintendent's invention weighs Cwts. 5, 0, 8 ;* I leave the Committee to decide which of the two principles of construction is preferable for Mountain Train.

* Including wheels.

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13. With regard to the Mountain Train Carts, in para. 3 of my Memorandum, dated 1st August 1851, which was laid before the Committee at their Meeting of the 17th Instant, it will be seen that they have for many months been under experiment at Artillery Head Quarters, under the Director Artillery Depôt, who has taken them over the steepest parts of the Mount, and every description of ground in the neighbourhood ; in addition to this, one cart was sent to Bangalore for Experiment under His Excellency the Commander-in-Chief's orders, and returned to Madras fully equipped for Service, drawn by two bullocks, in December 1850 ; these tests of this pattern of cart, have been tolerably severe, and it has stood them uninjured.

14. I have felt called upon to enter thus minutely into details, because I think it of the first importance, that the Mountain Train equipment may be made at once available for General Service ; and I would respectfully submit for the consideration of superior authority whether it would not be for the advantage of the Public Service, that an Officer on offering objections of the Committee's resolutions should be required fully to state the grounds of those objections, otherwise, his observations to form no part of the Committee's Proceedings, for example; in the present instance, if the Superintendent was aware of any scientific ground of objection to the principle of construction adopted by me in my 3 Pdr. or 4⅔ Inch, it appears to me that he should either have particularized them at any convenient time during the last 15 months, or have entered them in his Minute of the 18th Instant: he has not, however, offered any observations or suggestions, but simply objects at the eleventh hour. The novelty of my construction I admit, its faultiness the Superintendent has yet to explain.

St. Thomas' Mount, 19*th September*, 1851. } (Signed) A. F. Oakes, Captain, *Director Artillery Depôt.*

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Letter No. 6088, *from the Secretary Military Board, to the Brigadier Commandant of Artillery, dated* 15*th October* 1851.

Meeting 171, Article 632, dated 17th September 1851.

Refering to the recommendation of the Select Artillery Committee as expressed in their Proceedings as per margin, for the introduction of new pattern Ordnance carriages, on the proof alone prescribed, for testing the qualities of new carriages of established pattern, I have the honor by order to express the opinion of the Board that new patterns of carriages should undergo a more severe test, before being adopted into the Service, as the Board believe has always been before adopted as firing at high elevation, heavy quick firing with shot, &c. &c. to which trials as formerly used, the Board wish these carriages to be subjected.

ARTICLE 633.

IRON MORTAR BEDS FOR 5½ AND 4⅘ INCH BRASS MORTARS.

(a) 3858, 1st July 1851.

The Military Board direct[a] that two Iron Mortar Beds for 5½ and 4⅘ inch Brass Mortars, be laid before the Select Committee, in order that should they be approved of, their adoption may be taken into consideration.

OPINION.—By the Reports dated 26th June 1851, these Beds appear to have stood proof uninjured, and the Committee consider that they are well adapted for General Service.

DECISION.—These Beds to undergo a severe test before being adopted into the Service. *(See Military Board's letter No.* 6079, *to the Brigadier Commandant of Artillery, dated* 15*th October* 1851.*)*

ARTICLE 634.

PROPOSITION TO SEND NEW CARRIAGES TO OUT-STATIONS IN PIECES.

(a) No. 4564, 4th August, 1851.

The Military Board direct[a] the following proposition of Major W. H. Miller, Com-

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missary of Ordnance N. S. Force be laid before the Select Committee for their report.

"It being always necessary to repair every new Carri-
" age sent to Nagpore from the Presidency, owing to the
" shrinkage of the wood work, it is proposed to send new
" Carriages to out-stations in pieces, to be put together on
" arriving at their destination, with the view to remedy this
" defect."

OPINION.—The Committee observe that Major Miller in his letter to the Military Board, reports that "for the
" last 7 years, every new Carriage received at Nagpore
" from the Presidency, has required more or less repair,
" frequently to a very considerable extent before it could
" be used," which he attributes, "chiefly, if not entirely to
" the timber of which the carriages are constructed not
" being properly seasoned," he therefore suggests, as a measure likely to be beneficial to the Public Service that, "the
" Carriages should be first built in the Gun Carriage Ma-
" nufactory as now, the component parts being afterwards
" sent to Nagpore and Mhow in pieces to be there put
" together."

2. The Committee cannot approve of Major Miller's suggestion for remedying the evils arising from the use of unseasoned wood in Gun Carriages, and avail themselves of the opportunity of the subject being again brought to their notice, to repeat their recommendation to the Military Board that the suggestions of the Committee, submitted in Meeting 168, Article 609,* on the subject of ascertaining the most effectual method of seasoning wood, be carried into operation.

DECISION.—Not considered to be attended with the advantages anticipated. *(See Military Board's letter No. 6024, to Major Miller, dated 11th October, 1851.)*

* Page 192.

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ARTICLE 635.

Captain Oakes' Wrought Iron 9 Pounder Gun.

(a) No. 4771, 14th August 1851. The Military Board call(a) for the opinion of the Permanent Artillery Select Committee, as to the fitness of Captain Oakes' Wrought Iron 9 Pounder Gun, as a piece of Ordnance, after such test trialas the Committee shall consider necessary.

The following Documents are laid before the Committee.

(a) No. 226, 14th May 1851. (b) 7th July 1851.* 1. *Printed Letter and Memo.; from Captain A. F. Oakes, to the Brigadier Commandant of Artillery(a) with Appendix.(b)*

(c) 14th May 1851. 2. *Report of Experiments with Captain Oakes' Wrought Iron 9 Pounder Gun and a Brass 9 Pounder, (c) and the following Memo.*

Memorandum by Captain A. F. Oakes, Director Artillery Depôt, dated 11th September 1851.

Pamphlet accompanying. 1. In addition to what I have stated in my letter dated 14th May 1851, to the Brigadier Commandant of Artillery, *I would invite attention to the advantages of the* 9 *Pdr. Calibre for Horse Artillery in India, as ably advocated by Major Tennant of the Bengal Horse Artillery in his Minute, dated June* 1836, and which is published in the Madras Artillery Records under the head of Special Board Proceedings, Pages 50 to 53 inclusive.

2. It may be said that "The introduction of a larger Shot "into the limbers would bring with it a loss of one round of "Ammunition in every three;" if the advantages of the greater Calibre of a 9 Pdr. do not more than compensate for this diminution in the number of rounds with each Subdivision, a similar objection may be made to a 12 Pdr. Howitzer, and by the same process of reasoning a 3 Pdr. might be pronounced a better piece than a 6 Pdr.

* Published in Artillery Records for August 1851, head "Memorandum," pages 1 to 8.

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The following are the number of rounds in each limber.

Table Contrasting the Number of Rounds carried by a 12 *Pdr. Howr.*, 9, 6, *and* 3 *Pdr. Gun Limber, and Axletree Boxes.*

Description of Projectile.	12 Pdr. Howr.	9 Pdr. Gun.	6 Pdr. Gun.	3 Pdr. Gun.
Shells Common,.....	10	0	0	0
Shot Round,.....	0	18	26	26
„ Spherical Case,.....	14	6	8	10
„ Canister, ...	12	10	19	20
Total No. of Rounds in each,....	36	34	53	56
Total weight of Ammunition and Stores,.....	470 lbs.	461 lbs.	485 lbs.	425 lbs.

3. With reference to the failure many years ago of our old 8 cwt. and 3 qrs. 9 Pdr. Brass Gun, its defect in my opinion was the misplacing of the trunnions, which cannot be applied to this iron 9 Pdr., whose axis of trunnions is about 2 inches nearer the centre of gravity than in the gun referred to, and objected to by Sir Alexander Dickson, Royal Artillery, the metal of my 9 Pdr. is also very differently disposed of at the breech and along the bore.

4. With reference to my allusion to Major General Sir Robert Gardner's and Sir Augustus Fraser's recorded opinion upon this subject, the circumstances under which the former distinguished officer wrote his Pamphlet must not be lost sight of; the continuance of the Horse Artillery branch of the Artillery Service was at that time under discussion: and the $13\frac{3}{4}$ cwt. 9 Pdr. was the gun in use with the Royal Artillery, not the light 10 cwt. gun of the Artillery in India; this fact is incontrovertible, for the Pamphlet is dated March 1848, and Captain Grant's evidence, (of the Royal Artillery) before the Committee of the House of Commons on the Ordnance Estimates was given on the 25th June 1849, wherein will be found the following :—

Question by Committee.—Of what weight were the 9 Pdrs. used at Waterloo.

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Answer by Captain Grant.—13 cwt. and 3 quarters on an average.

5. The incalculable advantage of having only one Calibre of guns (9 Pdrs.) in the Regiment instead of 9 and 6 will doubtless have full weight with the Committee.

OPINION.—The Committee recommend that this 9 Pdr. be again proved according to the established proof for a brass gun of the same calibre; that it be afterwards sent to the Gun Carriage Manufactory to be mounted on a 9 Pdr. Select Committee Carriage,* and placed at the disposal of the Officers Commanding 2nd and 4th Battalions at Artillery Head Quarters for trial and report, till the end of the year; to be used throughout the ensuing Practice at Artillery Head Quarters, and the first opportunity to be afterwards taken of sending it for three months under the Officer Commanding a Horse Battery for trial and report.

2. That the Reports of the above Officers be hereafter laid before the Committee for their further consideration.

MINUTE BY CAPTAIN BLACK.

The established proof for a brass Gun of the same calibre appears to me to be insufficient.

(Signed) B. W. BLACK, Captain.

18*th September*, 1851.

I agree with Captain Black.

(Signed) G. ALCOCK, Lieutenant Colonel.

30*th September*, 1851.

* It has since been ascertained that this gun cannot be mounted on a 9 Pdr. Select Committee pattern Carriage as above recommended, excepting at a great disadvantage, because it measures from its trunnions' axis to the base ring 3½ inches shorter than an ordinary 9 Pdr. gun, and consequently the breech would not sit fairly on the capstan head of the elevating screw of the Select Committee Carriage, which having a block trail, this defect could not be easily remedied. The gun however can be fitted to a Cullens' pattern in the course of a day, without trouble or expense.—A. F. O.

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ARTICLE 636.

Measurement of Ordnance and Gauging of Projectiles.

(a) No. 2821, 14th May 1851.

The Military Board direct(a) the Select Committee to take into consideration the subject of the measurement of Ordnance and the gauging of projectiles with the view to adopt some definite rule by which the Ordnance Department and Regiment of Artillery shall be guided.

The following Documents are laid before the Committee.

1. *Memorandum No. 391, from the Director Artillery Depôt, to the Brigadier Commandant of Artillery, dated 29th July,* 1851.

(a) No. 2821, 14th May 1851.

Adverting to the Military Board's letter(a) requiring the following information.

What diameter of bore should condemn each piece of Ordnance as unserviceable, and the same with regard to the diameter of gauges. Before submitting the subject to the Select Committee, I would beg to offer the following observations.

2. It would appear that the new gauges received on the "City of Poonah" and sent(b) without any specific orders from the Military Board to Artillery Head Quarters, and which have caused so much correspondence,(c) were after all, never intended to be used as gauges to regulate the acceptance or rejection of our projectiles, but that some of them were "made* to check the "old store of shells which were in use previ- "ously to the diminution of windage" and the remainder not applicable to the projectiles in use with the Artillery in India.

(b) September 1846.

(c) Meeting 136, Article 421, Artillery Records, Page 502.

* Letter from Honorable Court of Directors, 21st April 1847.

(c) Letter from Brigadier Comt. of Arty: to Sec. Mily. Board, No. 35, 4th February 1851.
Letter from Sec. Mily. Board, No. 1093, 9th March 1850.
Letter from Brigadier Comt. of Arty. No. 76, 8th February 1850.
Letter from Brigadier Comt. of Arty. No. 210, 26th March 1850.

3. What diminution of windage is here alluded to? this information appears to be necessary before the Select Committee can even enter upon this question. Our standard now is

With iron Guns and Mortars ·15 increase in the diameter of the bore renders the piece unserviceable.

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Letter from Sec. Mily. Board, No. 1420, 2d April 1850.

With Brass Guns and Mortars ·1 increase in the diameter of the bore, renders the piece unserviceable.

4. Taking a 24 Pdr. Gun at $\frac{1}{100}$ less than its unserviceable bore, (viz. 5·96) and its old low gauge diameter (5·55) the greatest allowable windage would be ·41. How can accuracy of practice be expected if greater windage than this were permitted?

5. I would recommend that the Royal Artillery Tables be furnished under the following heads:

Diameter of Bore.

Diameter which now renders the piece unserviceable.

Gauges for shot and shells, { High. Low.

6. I have appended a Table showing the greatest allowable windage of all calibres on the principle referred to in para. 4, according to our present standard.

Table showing the Maximum windage allowable according to our present standard, allowing for each piece $\frac{1}{100}$ less than its unserviceable bore, and giving the difference between that and the low old gauges.

Nature of Ordnance.	Diameter of bore which now renders the piece unserviceable less $\frac{1}{100}$.	Diameter of the old Low Gauges.	Greatest allowable Windage.
Guns.			
68 Pdr.	8·19	7·85	·34
32 ,,	6·55	6·147	·403
24 ,,	5·96	5·55	·41
18 ,,	5·43	5·07	·36
12 ,,	4·76	4·4	·36
9 ,,	4·29	4·06	·23
6 ,,	3·75	3·53	·22
3 ,,	3·	2·80	·20
Mortars.			
13 Inch.	13·14	12·8	·34
10 ,,	10·14	9·8	·34
8 ,,	8·14	7·85	·29
5½ ,,	5·77	5·50	·27
4⅕ ,,	4·65	4·38	·27
Howitzers.			
10 Inch.	10·14	9·8	·34
8 ,,	8·14	7·85	·29
24 Pdr.	5·77	5·55	·22
12 ,,	4·65	4·40	·25
4⅕ Inch.	4·65	4·38	·27

Artillery Depot, 29*th July*, 1851.

(Signed) A. F. Oakes, Captain, *Director Artillery Depôt.*

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2. *Extract from a letter from the Honorable the Court of Directors, dated 21st April* 1847.

No. 26.

8. Forward a Bill of Lading for certain shell gauges shipped on the Steamer "Precursor" and returned by the Military Board as being deemed objectionable by the Artillery Select Committee for being too low, together with communications from that Board on the subject.

25. The Shot and Shell Gauges forwarded to your Presidency per ship "City of Poonah" were prepared in the Department of the Inspector of Artillery in the Royal Arsenal, Woolwich, and were received on the responsibility of the Board of Ordnance.

26. We now find on reference to the proper authorities that the 8 inch 5½ inch and 4⅝ inch gauges were made *to check the old store of shells* which were in use previously to the diminution of windage, and of which there are no doubt a large quantity still in India, but to prevent inconvenience we shall forward to your Presidency without delay three sets of gauges of each of the descriptions above alluded to and of the dimensions recorded in the margin,* and these gauges will be suitable to the shells which have been forwarded to Madras within the last few years.

* High. Low.
8 inch 7·95 7·85
5½ ,, 5·62 5·57
4⅝ ,, 4·476 4·432

True Extract.

(Signed) C. A. Browne, Lieut. Col.
Secretary to Government.

Opinion.—The Committee cannot suggest any better arrangement for the measurement of Ordnance and the gauging of Projectiles than that laid down in 1845, approved by the Board in their letter No. 1454, dated 18th April 1845. If the Board desire the subject to be taken into further consideration, the Committee would wish to be informed of the data from which the Table above referred to, was prepared, and what objections have been found to its working.

Decision.—To be again submitted to the Artillery Select Committee for the purpose of a Table being framed. *(See Military Board's letter No.* 6023, *to the Brigadier Commandant of Artillery, dated* 11*th October* 1851.*)*

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ARTICLE 637.

Quoins and Elevating Screws for 13, 10, and 8 Inch Iron Mortars. (Plate 38.)

On Quoins and Elevating Screws for 13, 10, and 8 Inch Iron Mortars, submitted to the Artillery Select Committee by order of the Brigadier Commandant of Artillery.

The following Documents are laid before the Committee.

1. *Letter No.* 466, *from the Director of the Artillery Depôt, to the Brigadier Commandant of Artillery, dated* 4*th September,* 1851.

I do myself the honor to forward herewith a drawing of Quoins and Elevating Screws for 13, 10, and 8 Inch Iron Mortars, copied from the original received by me from Captain Gaisford, Director Artillery Depôt of the Bombay Artillery, which I solicit your permission to submit to the Artillery Select Committee.

2. These Quoins and Elevating Screws were brought into use in the Bombay Artillery at the suggestion of Major Coghlan of that Regiment, from an idea that although entire screws were not found to answer with Cast Iron Mortar Beds of the present pattern, the trouble and inconvenience of elevating Mortars by means of wooden Quoins, might be obviated by a screw projecting, not more than its own diameter above the surface of a quoin, so as in fact to be equally hard to bend, as to crush.

3. An 8 Inch Iron Mortar fitted up at the Artillery Depôt with an old Elevating Screw, was used at the last Annual Artillery Practice at Head Quarters, and at every Monthly Proof of Gunpowder since January last, I have found it to answer admirably. The elevation can be given with quickness and precision, and the use of hammers, small quoins, &c. unnecessary. Although it was intended (I am informed) by the projector to confine the use of these particular Quoins and screws to Elevations of 45° they have been used at Bombay at Elevations as high as 60° without sustaining the least injury.

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4. I would suggest that these Quoins and Elevating Screws be tested by being brought into use at the next Annual Practice at Artillery Head Quarters, should the Select Committee approve, and that instructions be given to the Superintendent Gun Carriage Manufactory to make up the number and description marginally noted according to the dimensions laid down in the accompanying drawing.* The perforations marked A for fastening the Quoin to the transom of the Bed by the bolt marked B, might conveniently be made at Artillery Head Quarters.

13 In. No. 1
10 ,, ,, 2
8 ,, ,, 4

* Plate 38.

OPINION.—The Committee recommend that Major Coghlan's (Bombay Artillery) Quoins be brought into use at the next Annual Practice at Artillery Head Quarters; and that instructions be given to the Superintendent Gun Carriage Manufactory to make up the number and description marginally noted according to the dimensions laid down in the accompanying drawing.† The perforations marked A for fastening the Quoin to the transom of the Bed by the bolt marked B being made at Artillery Head Quarters.

13 Inch No. 1
10 ,, ,, 2
8 ,, ,, 4

† Plate 38.

DECISION.—Peddowk wood in the construction of the Quoins of Major Coghlan's pattern lately ordered to be made up approved of. *(See Military Board's letter, No. 6354, to the Superintendent Gun Carriage Manufactory, dated 29th October, 1851.)*

ARTICLE 638.

FAILURE OF SHORT PERCHES OF COLONEL CULLEN'S ASSIMILATED CARRIAGES.

The Military Board direct(a) that the report of failures in the short perches of Cullen's assimilated Carriages at Bangalore, and suggestions for the strengthening of short poles of Waggons, &c., may be laid before the Artillery Select Committee.

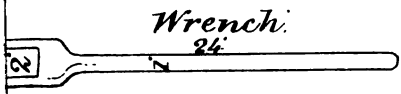
(a) No. 5320, 8th Sept. 1851.

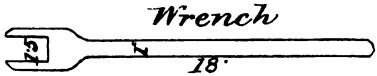
(a) No. 3477, 3rd June 1851.

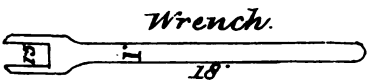
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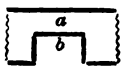
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The following Documents are laid before the Committee.

1. *Letter No. 266, from Captain A. F. Oakes, Horse Artillery, Director Artillery Depôt, to the Brigadier Commandant of Artillery, dated Bangalore, 27th May,* 1851.

I have the honor to report to you that I yesterday went to the Bangalore Arsenal for the purpose of examining the fractured "short perches" which had been removed from four of the Cullen's Carriage Limbers reported upon by the Bangalore Artillery Committee.

2. All of them were broken in the same place, viz. over that part of the wood which is cut away to admit of the Perch being fitted to the axletree bed—the wood at this point of the Perch *a* (measuring from the under part of the iron brace plate which runs all along and is countersunk on the upper surface of the Perch) is only 1·66 inch, in thickness. I bring this circumstance to notice, because I am satisfied that no short Perch of Cullen's pattern, with the Limber assimilated to the Select Committee Pattern, will stand for any time, the wood being thus weakened where it has to support the greatest strain. Before assimilation, this weak portion of the Perch was very much strengthened by the large oblong Limber Box, whose bottom was made of one inch thick plank, running in a transverse direction to the Perch—in the assimilated Limbers this support is altogether removed by the substitution of the two small boxes, the inside keepers of which are clear of the Perch, and the Perch thus becomes exposed.



a b inch 1·66.

3. To remedy this, I propose for consideration to shorten the Perch, the leverage being thus diminished the strain on the weak point will be proportionally reduced.

4. Whether it would be advisable further to strengthen these Perches, the Select Committee can decide: I have no papers or Carriages to refer to here, and therefore am unable tc draw a comparison with the Perches now complained of, and those adapted (of the shorter pattern) to the special Board Limbers.

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2. *Letters from the Military Board, to the Brigadier Commandant of Artillery (above quoted).*

3. *Extract of a letter from the Ordnance Officer at Bangalore, to the Military Board, forwarded to Artillery Head Quarters with letter from the Board No.* 5320, *dated* 8th *September,* 1851.

"All of them giving way in the same place, viz. over the axletree bed (vide Plan A *a b*)* induces me to believe that the strength of the short pole is insufficient, and that those of the present dimensions cannot stand the rough usage, Horse Artillery Carriages may be subjected to, I would therefore suggest that the short poles be increased in width 1½ inch each side over the axletree bed (Plan B *c d*) which would give an additional strength of about 6 square inches of timber, doubling the present quantity, besides bringing the short pole partly under the ammunition boxes *(e f)* and thereby acquiring an increase of support."

"The short pole might be strengthened (Plan G) by increasing its thickness as the ammunition boxes in the present construction do not come over the pole, its being above the flush of the axletree bed would be no inconvenience, but to do this a change would be required in the pintail (vide Plan C) which could not be made without injuring the strength of the iron; by increasing the breath of the pole instead of the thickness, the iron work would answer as it is at present."

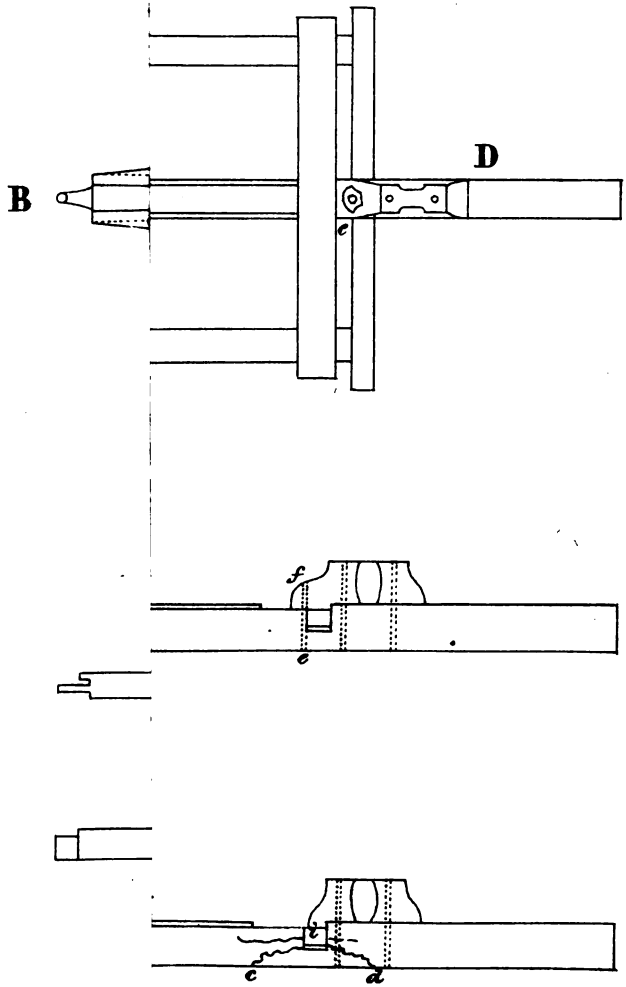
"All occurring in the same place and being of a like nature, viz., in the perches at the hollow made to receive the front frame (vide Plan G *c d)* and in the side frame at the hollow over the axletree bed (Plan E *a b*) that the construction is faulty, and it appears to me that the fault lies in the axletree coming in the centre of the frame, thereby causing an equal weight to be on each side of the axletree, acting upon the frame at its weakest place, viz., over the axletree and by the equal balance causing great jolting when the waggon is in motion and in consequence a great strain upon the perch at *i*, this is I think clearly proved by 4 out of 9 perches breaking at *i*, and 6 out of 18 side frames giving at *a b*. I would

* Plate 39.

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e.

Familated Carriages.



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therefore suggest for the Board's consideration that in future construction, the axletree be placed 8 inches further back (Plan D) by which means the weight of the back ammunition boxes would be thrown partly on the top of the axletree instead of all behind it and a larger proportion of the entire weight of the ammunition boxes would be thrown on the front of the Carriage thereby preventing the constant jolting of the Waggon, which I have no doubt is the cause of the perch giving at *i*."

"The perch can also be much strengthened by lengthening the saddle and bolting it on the inside (Plan D and H *e f*) this probably of itself would prevent the perch breaking at this place."

"The bands under the side frames might with great advantage be lengthened and bolted as in Plan F *g h*. I have indicated by a broken line the general direction of the cracks and beg to submit to the Board, that judging from the state in which the waggons of the B and F Troops Horse Artillery were sent to the arsenal for repair, I feel confident that the present construction is unfit for Horse Artillery purposes."

OPINION.—The Committee are of opinion that the instructions already given for shortening the short perches of Cullen's limbers, will strengthen them sufficiently for all service purposes: with regard to Cullen's waggon perches, they were not intended to bear the weight of a spare wheel when originally constructed; to replace the old perches by new ones, in order that spare wheels may be carried, would be inexpedient, as all the Carriages and Waggons of this pattern are very old, the Committee therefore would recommend that spare wheels should not be carried with perches of Cullen's pattern, and that the saddle blocks be removed accordingly.

Meeting 169, Article 625, 12th April 1851, Page 242.

DECISION.—The Waggon perches of Colonel Cullen's pattern not being intended to bear the weight of a spare wheel when originally constructed, the saddle blocks to be removed, and not put on in future assimilations *(See Military Board's letter No. 6612, to the Superintendent Gun Carriage Manufactory, dated 12th November, 1851.)*

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MEETING 172.

EXTRACT FROM THE PROCEEDINGS OF THE PERMANENT ARTILLERY SELECT COMMITTEE, ASSEMBLED BY ORDER OF LIEUT. COL. F. F. WHINYATES, BRIGADIER COMMANDANT OF ARTILLERY.

Artillery Depôt, Saint Thomas' Mount, 27th October, 1851.

Present.

LIEUT. COL. F. BLUNDELL, C. B. *Principal Commissary of Ordnance.*
LIEUT. COL. H. S. FOORD, *Commanding 4th Battalion Artillery.*
MAJOR J. BACK, *4th Battalion Artillery.*
CAPTAIN J. MAITLAND, *Superintendent Gun Carriage Manufactory.*
CAPTAIN A. F. OAKES, *Director Artillery Depôt.*
CAPTAIN B. W. BLACK, *Assistant Adjutant General of Artillery.*

ARTICLE 639.

MOUNTAIN TRAIN CARRIAGES.

On the expediency of further testing by an extraordinary Proof the Mountain Train Carriages proposed by Captain A. F. Oakes, reported on by the Select Committee.[a]

(a) Meeting 171, Article 632, Page 261.

The following Document is laid before the Committee.

Letter from the Secretary Military Board, to the Brigadier Commandant of Artillery.[b]

(b) No. 6088, 15th October 1851, Page 271.

OPINION.—The Committee resolve that the whole of these Carriages shall be further tested by the following extraordinary Proof in addition to the ordinary proof which they have already undergone.

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Carriages.	Rounds.	Charge.		Elevation.
		ozs.	drs.	
5½ Inch Mortar Carriage.....	30	6	10	20° 45° 60°
„ „ „ on its wheels.	15	6	0	16°
4⅘ Inch Howitzer Carriage.	90	8	0	30 rounds at P. B. 30 „ at medium.
3 Pdr. Gun Carriage.....	90	12	0	30 „ highest elevation.

Memorandum, 30th October, 1851.

The above Proof took place on the mornings of the 29th and 30th Instant, when the Carriages stood the Proof uninjured as shown in the accompanying Proof Reports.(a)

(a) Dated 30th October 1851.

ARTICLE 640.

Iron Mortar Beds for 5½ and 4⅘ Inch Brass Mortars.

On the expediency of further testing by an extraordinary Proof the 5½ and 4⅘ Inch Iron Mortar Beds of Major Anstruther's pattern, reported on by the Select Committee.(a)

(a) Meeting 171, Article 633, Page 271.

The following Document is laid before the Committee.

Letter from the Secretary Military Board, to the Brigadier Commandant of Artillery.(b)

(b) No. 6079, 15th October 1851, Page 271.

Opinion.—The Committee resolve that these Beds shall be further tested by the following extraordinary Proof in addition to the ordinary Proof which they have already undergone.

Beds.	Rounds.	Charge.		Elevation.
		ozs.	drs.	
5½ Inch Mortar Bed,....	30	6	10	20° 45° 60°
4⅘ Inch Mortar bed.	30	3	6	20° 45° 60°

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Memorandum, 30th October, 1851.

The above Proof took place on the morning of the 29th Instant, when the abovementioned Beds stood the Proof uninjured as shewn in the accompanying Proof Reports.[a]

(a) Dated 30th October 1851.

ARTICLE 641.

Captain Oakes' Wrought Iron 9 Pounder Gun.

Whether Captain A. F. Oakes' Wrought iron 9 Pounder Gun reported on by the Select Committee at their last Meeting[a] shall undergo any further trial, with the view of testing "*its fitness as a piece of Ordnance in throwing shot.*"

(a) Meeting 171, Article 635.

The following Documents are laid before the Committee.

1. *Letter No.* 6111, *from the Military Board, to the Brigadier Commandant of Artillery, dated* 17*th October*, 1851.

Having laid before the Military Board the Artillery Select Committee Proceedings, Meeting 171, Article 635 on Captain Oakes' Wrought Iron 9 Pdr. Gun, they directed me to observe, that in my letter No. 4771, I conveyed to you the Board's request to have the opinion of the Committee *on the Gun as a piece of Ordnance* and they request that in again laying it before the Committee, you will be so good as to request them to report *on its fitness as a piece of Ordnance in throwing shot,* and they further authorize the piece itself being subjected to proof, should the proprietor have no objections; and should the Committee see any necessity in testing its relative merits with the existing 9 Pdr. of 10 cwt. or the obsolete 8¾ cwt. 9 Pdr. piece, the Board will, if requisite, authorize these pieces being used at the same time to ascertain the distance these pieces throw shot in comparison with the new 9 Pdr., and will authorize iron Garrison Carriages being used for the pieces.

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2. *Letter from T. Holroyd, Esq., to Captain A. F. Oakes,* (b) *stating that* the 9 Pdr. Gun had been proved at Woolwich on the 23d of August 1850, with 2 rounds of 4 lbs. charge, with two wads.

(b) Dated London, 21st December 1850.

OPINION.—This gun having already undergone a Proof at Woolwich, as shown by the above Document, (b) submitted by the Director Artillery Depôt, the Committee see no necessity for its undergoing a second Proof in this Country. It has been satisfactorily shown by the practice with this piece which took place at Artillery Head Quarters on the 14th May 1851, and laid before the Committee at their last Meeting, that the gun is accurate in its range, and quite equal to the Brass 9 Pounder of ten cwt.; no further practice would seem therefore to be necessary, excepting with Canister shot.

2. The Committee resolve that 25 rounds of Canister be fired from the 9 Pounder "quick firing" with the view of ascertaining the effect on the bore of the piece.

3. As the Committee have been given to understand that wrought iron guns have been objected to at Woolwich, they would recommend that the Honorable Court of Directors be requested to obtain, the ground of objection from the Woolwich Authorities.

MINUTE BY CAPTAIN BLACK.

I have already said I am of opinion the proof proposed insufficient, so likewise do I think that which the gun has undergone. In other respects I concur with the Committee.

(Signed) B. W. BLACK, Captain.

31*st October,* 1851.

MEMORANDUM, 10*th November* 1851.

The Experiments with Canister shot above recommended, and also with the same number of rounds of Canister from an ordinary Brass 9 Pdr. of 10 cwt. took place on the 30th October and 10th November 1851, when the bores of both guns were much injured, as shown in the accompanying Report of the Experiment (a) but neither of them have been rendered unserviceable.

(a) Dated 10th November, 1851.

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Report of Experiments with Captain Oakes' Wrought Iron 9 Pdr. Gun and a Brass 9 Pdr. of 10 Cwt. with the view of ascertaining the comparative effect of Canister Shot on the Bores of these pieces, as recommended by the Artillery Select Committee in Meeting 172, Article 641, 27th October, 1851.

Date.	Nature of Ordnance.	No. of Rounds.	Charge.		Canister Shot.			Elevation.		Medium Recoil.	REMARKS.
			lbs.	ozs.	No. of Balls in each Case.	Weight of each.	Total Weight.	D.	M.	feet.	
30th October, 1851.	Captain Oakes' Wrought Iron 9 Pounder Gun.	25	2	4	40	4	11	P.	B.	18	The bore of this Gun is much dented by the Iron Balls, varying from 1½ to 1 inch long, and from 4 to 6 tenths of an inch broad. The Gun was mounted on an Iron 4⅘ Inch Howitzer Carriage which will account for the great recoil.
10th November, 1851.	Ordinary Brass 9 Pounder Gun of 10. Cwt	25	2	4	40	4	11	P.	B.	5	This Gun has several scores from the Iron balls in the bottom of the bore, and a few in the right side, those in the bottom and one in the side appear rather longer and deeper than the scores in the Wrought Iron Gun. This Gun was mounted on a Select Committee pattern Carriage.

ARTILLERY DEPÔT,
St. Thomas' Mount,
10th November, 1851.

(Signed) A. F. OAKES, Captain,
Director Artillery Depôt.

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DESCRIPTION

OF THE

MOUNTAIN TRAIN AND ITS EQUIPMENT,

AS PROPOSED BY

CAPTAIN A. F. OAKES, H. A.

DIRECTOR ARTILLERY DEPOT OF INSTRUCTION,

ARRANGED UNDER THE FOLLOWING SECTIONS.

Section I.—Ordnance.

„ II.—Beds and Carriages.

„ III.—Transport in Draught of the Mountain Train.

„ IV.—Allotment of Ammunition for one or more subdivisions of each calibre, together with the mode of packing the same for service.

„ V.—Mountain Train Exercise and mode of carrying by hand.

„ VI.—Mountain Train Tables and Ranges.

SECTION I.

ORDNANCE.

The Mountain Train will consist of the following Ordnance:

5⅔ Inch Mortar.

4⅘ Inch Howitzer.

3 Pounder Gun.

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SECTION II.

BEDS AND CARRIAGES.

5½ Inch Mortar Bed and Carriage—Plates 1, 2 and 3.

The 5½ Inch Mortar is mounted on a wrought iron bed, constructed with an axle for the purpose of using wheels of 24 inches diameter; these wheels are put on when low elevations are given, viz. from 6° up to 16°; at these low elevations a fixed charge should be used of 6 ozs, which at 6° with a conical Chambered Mortar will give about 300 yards, and with 16° about 650; at elevations above 16° the wheels should be removed, and the Mortar fired on the bed which at

	ozs. . drs.			
45° with a charge of	2 . 8	will give a range of	300	yards
„ „	5 . 0	„ „ „	650	„
„ „	7 . 6	„ „ „	1000	„
„ „	8 . 8	„ „ „	1400	„

	cwts.	qrs.	lbs.
The Bed without wheels weighs.....	1	1	11
* Two wheels.....	0	2	12
The 5½ Inch Mortar.....	1	2	20
Total of Carriage and Ordnance.....	3	2	15

4⅘ Inch Howitzer Carriage—Plates 4 and 5.

The 4⅘ Inch Howitzer is mounted on a wrought iron Carriage, whose wheels are of 24 inches diameter.

	cwts.	qrs.	lbs.
The Carriage weighs.....	1	1	17
* Two wheels.....	0	2	11
The 4⅘ Inch Howitzer.....	2	1	10
Total of Carriage and Ordnance.....	4	1	10

* The wheels of the 5½ Inch and of the 4⅘ Inch, and axle arms are in every respect the same.

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3 *Pdr. Gun Carriage.—Plates* 6 *and* 7.

The 3 Pdr. Carriage is made of wrought iron, the wheels are of 3 feet diameter.

The weight is—	cwts.	qrs.	lbs.
Carriage.	2	0	16
Two wheels.....	1	1	3
3 Pdr. Gun.....	3	0	13
Total of Carriage and Ordnance...	6	2	4

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SECTION III.

TRANSPORT IN DRAUGHT OF THE MOUNTAIN TRAIN.

The 5½ Inch Mortar, Carriage Cart, and Ammunition Cart.

Carriage, *Plates* 8 *and* 9.—The 5½ Inch Mortar, its bed and wheels with 2 Ammunition boxes and a small store box are conveyed in a Carriage Cart, which with the 5½ Inch Ammunition Cart carries the whole of the stores and implements required both for the service of the piece in action, in draught, and for carrying by hand.

The 5½ Inch Mortar with its Carriage, implements, &c. is carried on the Carriage Cart in the following manner:—The 5½ Inch Bed with its piece is slung so as to place its axletree under the axletree of the Carriage Cart. In front are two Ammunition boxes and a small store box. Two wheels are lashed outside of the Ammunition boxes. One spunge, two handspikes and one linstock are lashed to the framing. Besides the regular allotment of small stores, the traversing handle is carried in the small store box. The Cart is drawn by one pair of bullocks or a single pony.

Ammunition Cart, *Plates* 10 *and* 11.—The Ammunition Cart holds 6 boxes and a small store box. All the Ammunition boxes are of the same size, each carries 3 rounds complete.

The 5½ Inch Ammunition Cart is used with pole or shafts, it carries 1 Keg for tar and grease, and 6 bamboos for carriying Ammunition boxes, which are slung underneath the framing; the Cart is drawn by one pair of bullocks, or by a single pony.

The 4⅘ Inch Howr. Carriage Cart and Ammunition Cart.

Carriage Cart, *Plates* 12 *and* 13.—The 4⅘ Inch Howitzer, its Carriage and wheels with one ammunition box and a small store box are conveyed in a carriage Cart, which with the 4⅘ Inch Ammunition Cart, carries the whole of the stores and

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implements required both for the service of the piece in action, in draught, and for carrying by hand.

Ammunition Cart, *Plates* 10 *and* 11.—The Ammunition Cart holds 6 boxes and a small store box. All the Ammunition boxes are of the same size, each carries 6 rounds complete.

The Ordnance and its Carriage as well as both Carts are drawn as laid down for the 5½ Inch Mortar.

The 3. *Pdr. Gun, Carriage and Ammunition Cart.*

3 Pdr. Carriage, *Plates* 6 *and* 7.—The 3 Pdr. Gun travels on its own Carriage with shifting shafts, it is drawn either by a single pony or a single bullock, its shafts work upon a swivel and weigh 69lbs.

Ammunition Cart, *Plates* 10 *and* 11.—An Ammunition Cart of the same pattern as that of the 5½ and 4⅘ Inch pieces, carries all the stores and implements required both for the service of the 3 Pdr. in action, in draught, and for carrying by hand. The Ammunition Cart holds 6 Boxes and a small store box; all the Ammunition boxes are of the same size, each carries 13 rounds complete.

General observations on the Carts.

The whole of these Carts are of the same construction, differing only in the inner fittings of the Boxes, which are adapted to the particular calibre; the axle arms and the wheels are the same, also the poles and shafts. The width between the wheels corresponds with that of the common country cart, viz 40 inches including wheel tires.

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SECTION IV.

ALLOTMENT OF AMMUNITION.

The Allotment of Ammunition is carried on Carts and on single Bullocks, Ponies or Mules.

STATEMENT shewing the Allotment of Ammunition carried on one Carriage Cart, and one Ammunition Cart, of a subdivision of each of the following calibres of Mountain Train Ordnance.

Nature of Ammunition.	5½ Inch Mortar.			4⅘ Inch Howitzer.			3 Pounder Gun.	
	Carriage Cart 2 Boxes, No. in each box.	Ammunition Cart 6 Boxes, No. in each box.	Total of one Subdivision.	Carriage Cart, 1 Box.	Ammunition Cart 6 Boxes, No. in each box.	Total of one Subdivision.	Ammunition Cart 6 Boxes, No. in each box.	Total of one Subdivision.
Shells Common...	3	3	24	5	5	35	——	——
Shot Sphl. Case..	——	——	——	——	——	——	3	18
Shot round.....	——	——	——	——	——	——	8	48
Canister.....	——	——	——	1	1	7	2	12

The allotment of ammunition to be carried by single Bullocks, is arranged in the following manner:

120lbs is the maximum weight given for one Bullock load. The Gunpowder is carried in 45lb. barrels packed in wax-cloth and gunny; one Bullock carries two 45lb. barrels; the shot corresponding with one Bullock load of Gunpowder will necessarily vary according to the different calibres.

		shells.	lbs.
The load for one shot bullock for a 5½ inch	is	8	= 120
„ „ „ 4⅘ „	is	14	= 112
		shot	
„ „ „ 3 pdr.	is	40	= 120

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90lbs. of Gunpowder carried by each bullock is

sufficient for the

5½ inch Mortar	90 rounds	at 1lb. viz.	charge	6	ozs.
			bursting	10	„
4⅖ „ Howr.	110 „	at 13ozs. viz.	charge	8	„
			bursting	5	„
3 Pdr. Gun	120 „	at 12ozs.			

therefore for each bullock load of Gunpowder the following shells and shot will be required.

5½ inch Mortar	88 shells	or 11	bullock loads.
4⅖ „ Howr.	110 „	or 8	„
3 Pdr. Gun	120 shot	or 3	„

A good Pony will carry as much as a bullock, viz. 120 lbs. a good Mule will carry at least twice as much as a bullock, or 240 lbs. and a bad one about half as much again, viz. 180 lbs.

The following will be found in Part II, Vol. II, Page 423, Aide Memoire.

" Mules may be divided into three classes."

Can carry.

" 1st class, from 8 to 12 years old a little more or less 300 lbs.

" 2d class 12 years and upwards, and from 5 to 8 years old..... .....250 lbs.

" 3rd class, young mules under 5 years old, and very old mules.....200 lbs.

" In a campaign, subject to forced marches, indifferent " food, and bivouacing, from 200 to 225 lbs., are consider- " ed a sufficient load."

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SECTION V.

MOUNTAIN TRAIN EXERCISE, AND MODE OF CARRYING BY HAND.

Plates 14 *and* 15.

5½ Inch Mortar Equipment.—To dismount and mount the 5½ inch Mortar for action requires 5 men.

Dismount the Mortar.—No. 1 commands and stands in rear of and close to the cart, 2 and 3 unkey and slip the thimbles off the points of the axles, 4 and 5 having previously raised the bed by placing their handspikes under the axle arms—No. 1 disengages the trail and gives the word "Lower," "March;" the Mortar and bed are then lowered to the ground, and the Driver advances 2 yards, wheels to the left about, and halts at 5 yards in rear of the bed, Cattle facing to the rear. Nos. 1, 2 and 3 then fall into their respective places to serve the Mortar—4 and 5 remain with the Carriage Cart and assist in serving ammunition, &c.

Mount the Mortar.—Nos. 2 and 3 fix the traversing handle and raise the front of the bed high enough to allow 4 and 5 to place their handspikes under the axle arms, the Driver at the same time reins back until the axletree of the Carriage Cart is immediately over the centre of the Mortar. No. 1 then gives the word "Mount," 4 and 5 raise the bed, 2 and 3 place the thimbles on the axletree arms, 6 raises the trail, fixes and keys it; the handspikes, &c. are then lodged and each man falls into his place in rear of the Cart, as soon as the duty allotted him has been performed.

The detachment will invariably form in rear of the Cart by files right in front.

Dismounting the 5½ Inch Mortar and Cart, Mounting it afterwards, and the mode of carrying by hand.

Dismount for carrying.—The Mortar is dismounted as for action—2 and 3 then unlash the wheels and place them on the axle arms. No. 1 takes off cap squares and replaces them

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as soon as the Mortar is lifted—8 and 9 bring the carriers—6, 7, 8 and 9 fasten the slings to the Mortar, lift it off the bed and move on—4 and 5 bring the carriers—2, 3, 4 and 5 fasten the slings on the bed and follow the Mortar; in the meantime the Cattle are taken out and the Cart is dismounted. No. 1 gives the word "Forward," the whole close up and proceed in the following order:—Cattle—Body of Cart—Wheels of Cart—Ammunition boxes—Mortar bed—Mortar—distances from one portion to another, one yard.

"**Halt**" "**Mount.**"—At this command, the body of the Cart is halted, the wheels are brought up and the Cattle put to; the Mortar is mounted on the bed by the numbers told off for dismounting it, the Cart is backed over the bed, and the mounting proceeds as before described.

"**Put on the Wheels.**"—When in action as a Mortar, if required to action as a Howitzer, the command "Put on the Wheels" is given—2 and 3 raise the bed with the traversing handle and then put on the wheels.

The dead weight and the men required to carry each part are:—

	Weight in lbs.	No. of men.
Framing including small store box with pole or shafts and implements	269½	4
Two wheels for cart (each weighing 115½ lbs.)	231	6
Two ammunition boxes stowed (one box weighs 78 lbs.) each slung on a bamboo	156	4
5½ Inch Mortar	188	4
5½ Inch Mortar bed with wheels	219	4
Total	1063½	22

Ammunition Cart.—The 5½ Inch Ammunition Cart is dismounted for carrying in the same manner as the 5½ Inch Carriage Cart.

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Its dead weight, and the men required to carry each part are :—

	Weight in lbs.	No. of men.
Framing including small store box with pole or shafts and keg for tar and grease.....	237½	4
Two wheels (each weighing 112½ lbs.).....	225	6
Six ammunition boxes stowed, (one box weighs 74 lbs.).....	444	12
Total....	906½	22

4 ⅘ Inch Howitzer Equipment.—The 4⅘ Inch Howitzer is exercised and its Equipment carried in the same manner as the 5½ Inch Equipment, excepting that the Carriage Cart takes two men less to carry it than the 5½ Inch, in consequence of its having one ammunition box less; the metal of the 4⅘ Inch requires 2 men more than the 5½, the total number of men required therefore is the same as with the 5½ Inch, viz. 22 men.

3 Pounder Gun Equipment.—The 3 Pounder takes a Non-Commissioned Officer and 3 men to work it, and their duties are as follows :—

No. 1 Commands, fires, and assists to disengage shafts.
2 Spunges, and assists to unhook.
3 Loads, serves ammunition, and assists to unhook.
4 Serves the vent, and assists to disengage shafts.

Dismounting the 3 Pounder Gun, Mounting it afterwards, and the mode of carrying by hand.

Dismount for carrying.—No. 1 takes out elevating screw bolt, removes capsquares and replaces them as soon as the gun is lifted off the Carriage—Nos. 4 and 5 lash a bamboo along the upper surface of the metal, 2 and 3, a bamboo crossways in front, 6 and 7, one cross-ways in rear, (in the meantime the pony is taken out) 8 and 9 place the shafts on the ground, their under surface uppermost—Nos. 8, 9, 10 and 11 place the Carriage upon the shafts and fasten it—12, 13, 14 and 15

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at the same time take off the wheels and lay them on the ground.

"**Mount**" "**March**,"—On this command, the whole raise the several portions on their shoulders and proceed in the following order :—Cattle—Ordnance—Carriage—Wheels: distances between each portion, one yard.

"**Halt**" "**Mount**."—On this command, the Ordnance is halted, the Carriage brought up, and the wheels put on; the Ordnance is then lowered on the Carriage, the shafts are attached, and the Cattle put to.

Fourteen men are required to carry the 3 Pounder Gun complete, viz:

Ordnance....	6
Carriage....	4
Wheels.....	4
Total...	14

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SECTION VI.

MOUNTAIN TRAIN TABLES AND RANGES.

5½ Inch Mortar.								4⅖ Inch Howitzer.								3 Pounder Gun.							
As a Mortar.				As a Howitzer.				Common Shell.				Canister.				Round Shot.				Canister.			
Distance.	Charge.		Elevation.	Distance.	Charge.	Elevation.		Distance.	Charge.	Elevation.		Distance.	Charge.	Elevation.		Distance.	Charge.	Elevation.		Distance.	Charge.	Elevation.	
Yards.	Ozs.	Drs.	D.	Yards.	Ozs.	D.	M.	Yards.	Ozs.	D.	M	Yards.	Ozs.	D.	M	Yards.	Ozs.	D.	M	Yds.	Ozs.	D.	
								200	8	1	15												
300	2	2	45	300	6	6	0	300	„	2	15	100	8	1	30	300	12	0	15	100	12	P.B.	
400	3	0	„	400	„	8	30	400	„	3	15	125	„	2	„	400	„	0	30	150	„	1/4	
500	3	14	„	500	„	11	0	500	„	4	15	150	„	3	„	500	„	0	45	200	„	1/2	
600	4	10	„	600	„	13	30	600	„	6	0	..	..	..	..	600	„	1	0	250	„	3/4	
700	5	6	„	700	„	16	0	700	„	7	45	..	..	..	..	700	„	1	30	300	„	1	
800	6	2	„	..	..	..	..	800	„	9	30	..	..	..	..	800	„	2	0				
900	6	12	„	..	..	..	..	900	„	11	15	..	..	..	..	900	„	2	30				
1000	7	6	„	..	..	..	..	1000	„	13	..	..	..	..	..	1000	„	3	0				

ARTILLERY DEPOT:
Saint Thomas' Mount,
1st *September*, 1851.

(Signed)
A. F. OAKES, *Captain* H. A.
Director Artillery Depôt.

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ALLOTMENT of ORDNANCE and STORES for one subdivision of each of the undermentioned Calibres for Mountain Train purposes.

ARTICLES.	5½ Inch Mortar.	4⅘ Inch Howitz.	3 Pounder Gun.
Ordnance brass	1	1	1
Carriage iron	1	1	1
Carriage Cart with 2 Ammunition and 1 small store box	1	0	0
Carriage Cart with 1 Ammunition and 1 small store box	0	1	0
Cart Ammunition with 6 boxes and 1 small store box	1	1	1
Augers Fuze brace	1	1	1
Bags bursting filled	24	35	18
Bamboos common 10 feet long	1	1	1
„ „ 8 „ „	1	1	1
„ „ 7 „ „	0	0	1
„ „ 6 „ „	0	1	0
„ „ 5½ „ „	8	6	6
„ „ 4½ „ „	0	0	3
Bits Gun steel	1	1	1
Bottles, Copper with 6oz. spirits of Wine	1	1	1
Boxes Copper Ammunition	8	7	6
„ „ Dredging	1	1	1
„ fuze with 30 spherical case shot fuzes	1	1	1
„ quick match with ½ skein	1	1	1
Caps Canvas spunge	1	1	1
Cartridges cloth filled 6oz	24	0	0
„ „ empty	16	0	0
„ Serge filled 8oz	0	42	0
„ „ „ 12oz	0	0	78
„ „ empty	0	14	12
Cloth waxed cubits	4	4	4
Compasses common	1	1	1
„ Calibre	1	1	1
Files saw	1	1	1
Funnels copper	1	1	1
Fuzes common	36	0	0
Grease maunds	1	1	1
Gunnies for powder barrels	* 0	0	0
„ for shot or shells	* 0	0	0
Hammers claw	1	1	1
Handle wooden with iron thimble and chain	1	1	0
Handspikes	2	0	0
Instruments perpendicular	1	1	1
„ Quadrant spirit level	1	1	1
Kegs for tar and grease	1	1	1
Knives Laboratory	1	1	1
Line seizing skeins	4	4	4
Linstocks	1	1	1

* According to the number of powder and shot bullocks required.

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ARTICLES.	5¼ Inch Mortar.	4⅝ Inch Howitz.	3 Pounder Gun.
Locks pad single with keys	10	9	7
Mallets setting	1	1	1
Mamoties with helves	1	1	1
Match gun cotton ..... skeins	1	1	1
Oakum ..... lbs	20	18	16
Pads for Bullocks	* 0	0	0
Pincers fuze brass	1	1	1
„ gun common	1	1	1
Pouches priming	1	1	1
„ for linch pins and washers	1	1	1
Props wheel	1	1	1
Rasps fuze half round 8 inch	1	1	1
Rope Bengal ..... skeins	1	1	1
„ Europe 1½ inch ..... Fathoms	12	10½	†14
„ Drag Light field ..... sets	1	1	1
Saws fuze	1	1	1
„ setter	1	1	1
Scales Tangent	0	0	1
„ Gunter	1	1	1
Scissors ..... Pairs	1	1	1
Setters fuze	1	1	1
Shafts ..... Pairs	2	2	‡ 3
Shells common loose	24	35	0
Shot round grummetted	0	0	48
Shot canister	0	7	12
Shot Spherical case	0	0	18
Spikes spring	1	1	1
„ ragged	1	1	1
Spunges	1	1	1
Supporting bar for carriage (when being carried on the Shafts)	0	0	1
Swivels with clip bands	2	2	1
Tar ..... gallons	1	1	1
Twine Europe ..... lbs	1	1	1
Vice hand fuze	1	1	1
Wires priming	1	1	1
Wrenches iron	1	1	1
Yokes new pattern	2	2	1

* According to the number of powder and shot bullocks required.

† On boxes, and for lashing 3 Pounder.

‡ 2 Pony 1 Bullock.

This table has been added for the convenience of Indenting Officers.

ARTILLERY DEPOT:
Saint Thomas' Mount,
17*th September*, 1851.

(Signed) A. F. OAKES, *Captain*, H. A.
Director Artillery Depôt.

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Time occupied in the Exercise of the different Calibres of Mountain Train Ordnance, &c. in presence of the Committee.

		Ms.	S.
5⅓ inch Mortar.	Dismounting for Action	0	17
	Mounting for Travelling	1	15
	Dismounting for carrying Mortar and Carriage Cart	1	56
	Mounting for Travelling Mortar and Carriage Cart	2	16
4⅝ in. Howitzer.	Dismounting for Action	0	15
	Mounting for Travelling	0	20
	Dismounting for carrying Howitzer and Carriage Cart	1	34
	Mounting for Travelling Howitzer and Carriage Cart	1	30
3 Pdr. Gun.	Dismounting for Action	0	15
	Mounting for Travelling	1	17
	Dismounting for Carrying	2	30
5⅓ inch Ammn. Cart.	Dismounting for Carrying	1	2
	Mounting for Travelling	1	15

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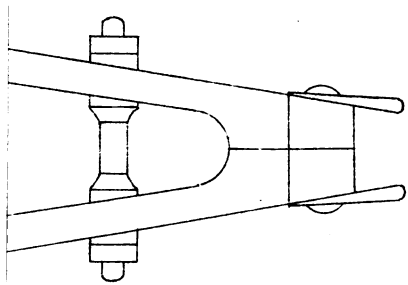
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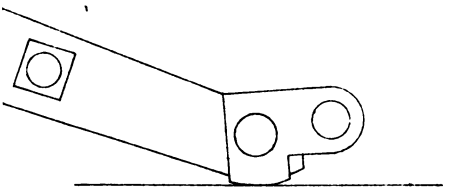
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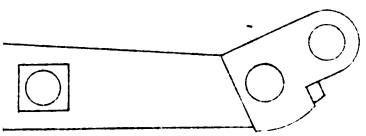


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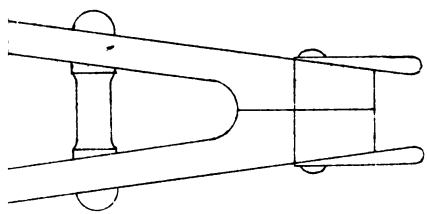
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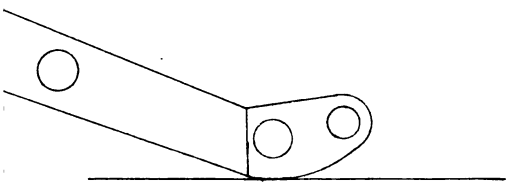
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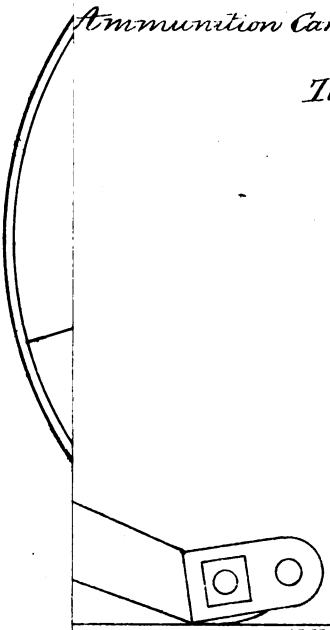
for a 5½ Inch Brass Mortar

for firing at low Elevations

	cwt.	Qrs.	lbs.
heels....	1	3	4
.....	1	2	23.
Total....	3	1	27.

following arrangement is suggested
carrying 102 rounds of Ammunition for
Piece.

	Rounds
ht Mountain Train Cart carrying rtar and Carriage complete and Ammunition Boxes.....	6
Ammunition Carts carrying 8 Boxes.....	96
Total with each piece....	102



PRACTICE TABLE WHEN USED AS A HOWITZER

Charge		Elevation	Distance
Oz.	drs.	Deg	yds.
6	"	6	285
"	"	11	503
"	"	6	680.

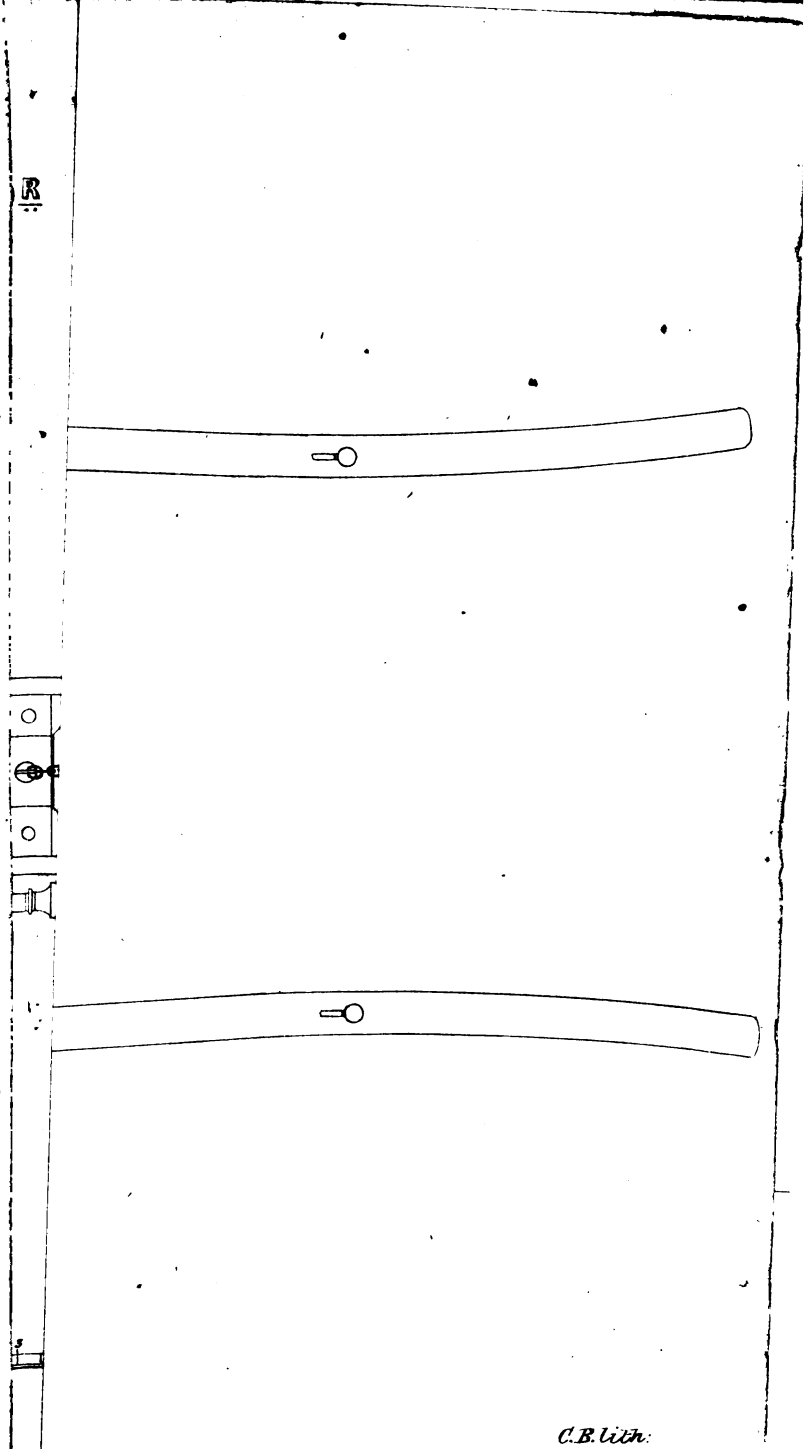
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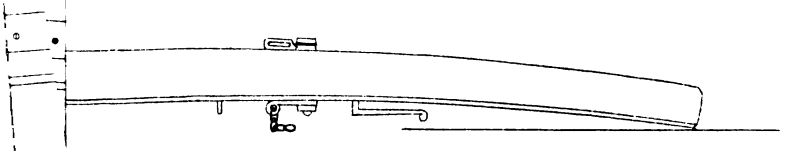
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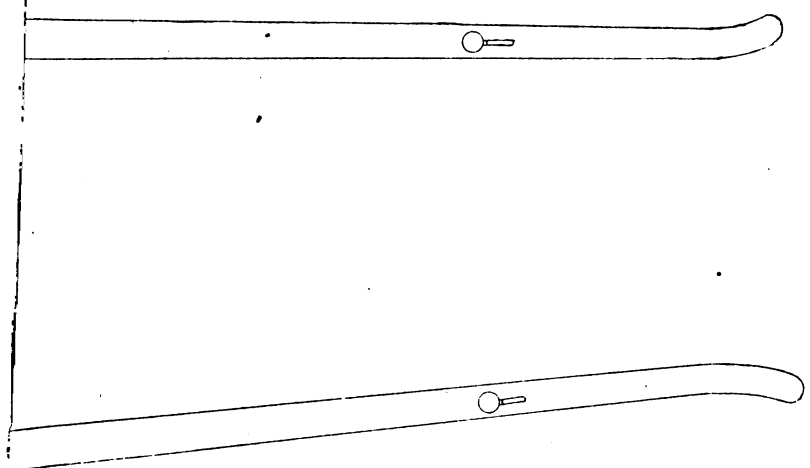


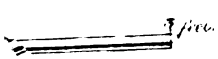
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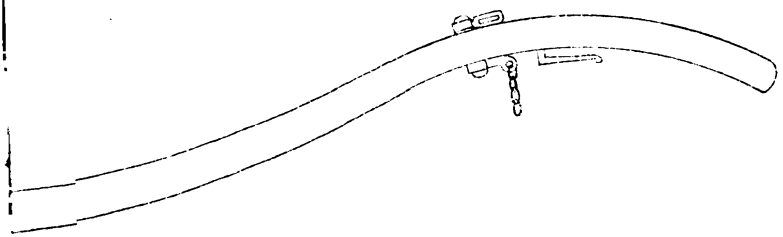


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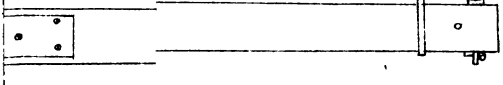
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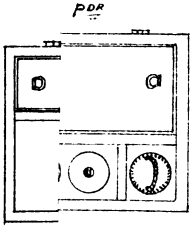
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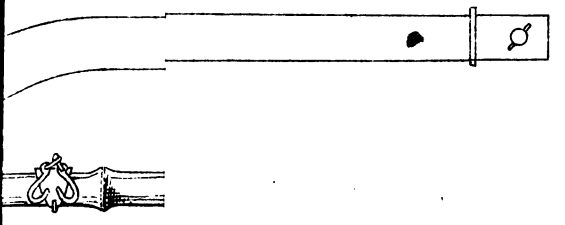
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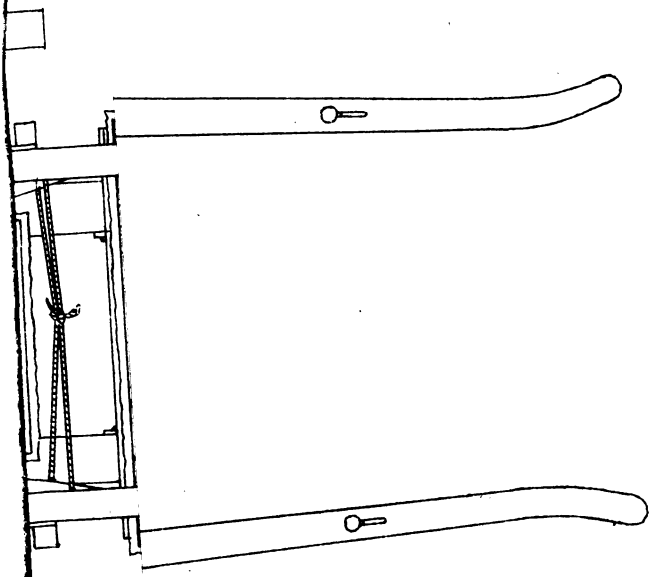
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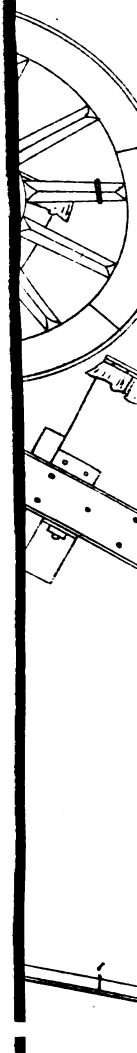


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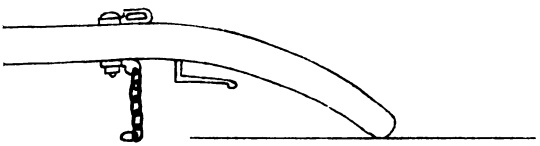
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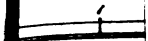
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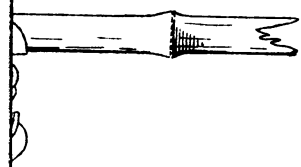
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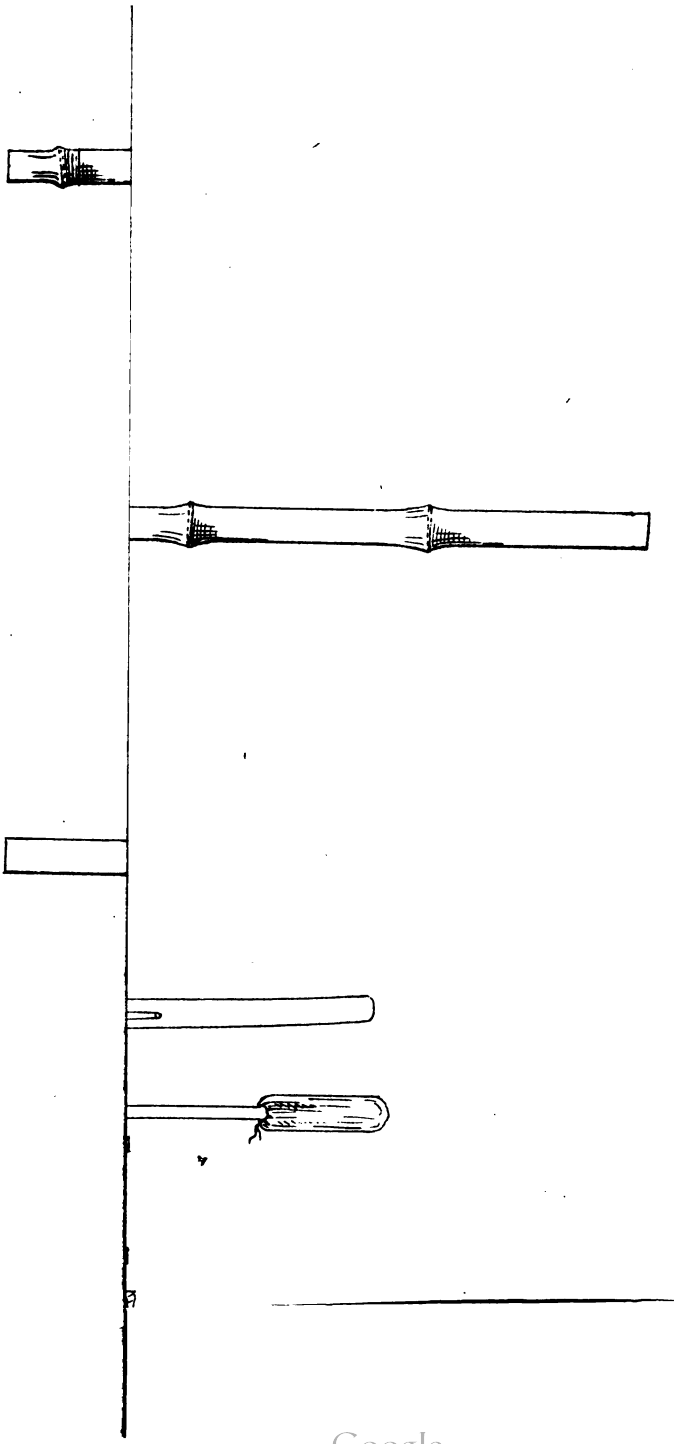






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